SUPPLEMENT.

The Mining Journal,

AILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

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Original Correspondence.

THE UTILIZATION OF SLAG.

ncement was made in the early part of this week with cture of slag bricks, on the principle recently patented PH WOODWARD, of Darlington. It is hardly necessary to eaders that the ironmasters of Cleveland have long looked he utilization of blast-furnace slag as a possible thing; ll attempts hitherto made to turn it to good account abortive, and the material was, therefore, thrown away But it was not alone because of its utter inutility that the blast-furnace was a cause of anxiety and concern masters. Its removal involved the employment of a er of hands, whose services might under other circumntirely dispensed with; and not only did this mean the t of a large sum in wages, but also the keep and main- more or less numerous stud of horses. Nor was this it. In order to carry on blast-furnace operations sucwas necessary to procure a good "tip" for the slag, and rwise eligible did not possess this primary essential it taken advantage of.

of years the slag deposit becomes filled up, and although ter has probably acquired 20 or 30 acres more than he ould have required, in order that there might be sufficir the reception of the slag, he is doomed in course of ess the filling up of this waste ground, so that an exhe site has to be obtained in order to admit of the slag d of effectually. In some cases it has become impossimasters to obtain suitable ground for an extension of p;" and where this cannot be done the scoriæ has to be o sea, or otherwise disposed of at a distance.

Middlesborough district attempts have been made, alon a very limited scale, to employ slag for road making nd the Commissioners of the Tees Conservancy have thousands of tons weekly in the construction of their ater, for which it appears to be admirably adapted. s only a drop in the bucket compared with the enormous of the useless product wherever blast-furnace operaried on; and ironmasters have hitherto looked in vain tantial relief from the cost and inconvenience of getting expensive and cumbersome material. Far reaching scoriæ are to be found in the neighbourhood of all large ting the failure of every attempt to effect its utilization, ractical men are agreed as to the practicability of turning count. Human ingenuity has done great things from unlikely materials, and we may fairly anticipate that ot far distant when the now despised and rejected problast-furnace will be made a source of profit instead of manufacturers.

le we have to record a very important approach towards end. Mr. Woodward, of Darlington, has patented a plan cturing bricks from scoriæ, and, as we indicate l at the com- of this article, the system is now fairly at work at the s of Mr. Thomas Vaughan. The slag is taken as it comes last-furnace. It runs into a series of moulds, placed at rvals on a revolving table. As this table turns on its ulds are allowed to fall to pieces, so as to enable the op out. This is done by raising a clamp, by which the mould are held together. After being removed from the bricks are thrown into a kiln or furnace close at they are annealed; and afterwards they are capable of in any ordinary structure for which clay bricks are suitng seen several of these scoriæ bricks as they come from ng furnace, we feel bound to declare our belief that they nswer the desired purpose. Their fracture is close and ey are capable of resisting an intense heat. So far as concerned, they will withstand a crushing force of 3 to ubic inch, or four to five times more than that of common other advantage of the scoriæ brick is that it remains y exposure to the atmosphere. There is a considerable kage, the bricks often coming to pieces in falling from , but once they have solidified they are almost, if not rd as granite. It is calculated they can be made for 8s. even less, whereas ordinary bricks cost 20s. and upwards In the cost of manufacture there is thus an important A new company has been formed on the limited liability o work Mr. Woodward's patent, and they have acquired the slag of all the blast-furnaces on the Tees, including bove and below Middlesborough. Ironmasters are lookl with much interest to the results of the new process, were carried out on a complete scale in the Cleveland ld lead to an economy of no less than 60*l.* or 80*l.* per arly every individual works in the North, apart altogethe saving that would be effected in the reclamation used for the deposit of slag. If we assume, as we fairly y striking an average 20 acres of land will be reserved pose at each works, we will have a total of over 600 lying waste in the North of England that could be reused for agricultural purposes.

well to explain that Mr. Woodward's patent does not e to the first application of slag, or scoriæ, for building For some time past a somewhat similar process, varying cording to the altered conditions under which the maduced, has been in use at Konigshutte, in Silesia, where tolerably successful. Under the latter system the slag the furnace into a hemispherical basin on wheels, the which is covered with sand, or fine coke dust, to the out 3 centimetres. Drawn to the spot where the bricks ade, the slag and sand are mixed together with a curved til most of the gases have escaped, and the mass asnsistency of dough. By the application of the same n drawn into a mould with a hinged cover, and punc- l times, to enable the remaining gas to escape. From e *rationale* of the manufacture as carried on in Silesia with that now being attempted in the Cleveland disbricks in Silesia cost 25 per cent. less than ordinary they do not readily absorb moisture they are largely onstruction of foundations.

Our readers may be interested in knowing that Mr. Thos. Greener, of Darlington, is chairman of the new Tees Scoriæ Brick Company, and that any further information as to the process of manufacture, or other collateral particulars, may be obtained either from him or from Mr. Woodward, the patentee.

FOREIGN MINING AND METALLURGY.

A royal Belgian decree approves the statutes of the South of Mons Collieries Company. Apprehensions are beginning to be entertained as to the possibility of executing coal contracts already concluded in Belgium, and new engagements are entered into with some difficulty and reluctance, although the current of fresh orders can scarcely be said to slacken. The apprehensions to which we have referred are occasioned by an anticipated great migration of workmen during the spring, which will leave many pits in a position of much embarrassment. Complaints are made with reference to the quality of the coal delivered by many Belgian collieries. The production of coke is acquiring a remarkable extension in Belgium. Thus in the Liége basin alone there are now 1615 coke furnaces in activity on the Coppée, Smet, Dulait, or Appolt systems. No less than 423 new furnaces—of which 50 are about to be lighted at Tilleur—are in course of construction, and the erection of 548 others is projected. According to the bulletin of the Union of Belgian Colliery Proprietors, the probable production of coke for 1874 is estimated at 3400 tons per day. The consumption of the great Cockerill, Ougrée, Sclessin, Grivegnée, and Espérance works is now about 1000 tons per day; the excess of the production over this consumption is delivered for exportation. The price of coal exhibits more firmness than ever; at Liége small ordinary qualities are especially in demand for brick-making purposes. German coal begins to make its appearance on the Belgian markets with considerable regularity. It has been selling at 1*l.* 6s. per ton, delivered at Charleroi, and it threatens in a not very remote future to compete seriously with Belgian coal of similar quality.

Notwithstanding the fall which has taken place in the Ruhr market, no appearance of an analogous movement can be noted either in the French or the Belgian coal trades. In these two latter countries the production becomes decidedly more and more insufficient; this is shown by the great and growing imports of English coal into France, and of German coal into Belgium, a competition being successfully maintained with indigenous coal in the very centre even of the producing districts. In the Nord coal, taken as it comes, is selling at 1*l.* 2s. 6d. to 1*l.* 4s. per ton. At Paris domestic qualities, delivered at consumers' cellars, are selling at 2*l.* to 2*l.* 4s. per ton. Floods last week interrupted traffic upon some of the French navigations, but a resumption of operations is noted on almost all the lines. Upon the whole, the condition of the French collieries is very good; all of them are overdone with orders, even with more than they can undertake, and the future does not induce apprehensions of any immediate change in this brilliant state of affairs. The Loire Mines Company proposes a dividend for 1872 at the rate of 12s. per share.

No fall in iron is noted in Belgium, and, indeed, one cannot take place so long as coal and coke are maintained with the firmness which they at present exhibit; at the same time, it may be remarked that purchasers exhibit some hesitation to do business upon present terms. Refining pig is dealt in at 6*l.* 4s. to 6*l.* 8s. per ton, and there is scarcely any stock. All offers for the supply of rails made for some weeks past have been refused by the principal Belgian metallurgical establishments, some of which are waiting for a long-postponed adjudication of *materiel* for the Belgian State lines, while others are apprehensive to enter into engagements for the future, having regard to the price of pig and coal, and the recent advance in rails in England. With regard to the adjudication for the State lines, it is fixed for the 19th inst., and it will comprise a rather considerable quantity of Vignoles iron or steel rails, as well as 4250 tons of old rails which the Belgian Government seeks to dispose of. The adjudication possesses rather a special interest, as a new *cahier des charges* is expected to appear on the occasion. The general situation of the Belgian siderurgical markets appears excellent, as business is flowing in on all sides. Makers of railway plant are not, however, enjoying their former prosperity, and some of them complain a good deal of want of work. Railway companies might, probably, obtain plant just now in Belgium upon easy and advantageous terms.

Chilian copper in bars, delivered at Havre, has made 90*l.* per ton at Paris; ditto in ingots, 94*l.*; English tough cake, 94*l.*; and Corocoro minerals, pure standard, 92*l.* per ton. At Marseilles, Spanish copper has brought 84*l.* per ton; refined Chilian and Peruvian, 90*l.* per ton; and old red copper 80*l.* per ton. While the Dutch tin markets are well supplied, the stocks of tin in London appear to be inconsiderable, and this circumstance has brought to Holland a strong demand on English account, so that Billiton is becoming scarce on the Dutch markets. Disposable Billiton is quoted in Holland at 85 fls. to 85¼ fls., and Banca at 86 fls. to 86¼ fls. The visible supply of Banca tin in Holland at the close of February was estimated at 174,925 ingots, as compared with 103,703 ingots at the close of February, 1872. The visible supply of Billiton tin in Holland at the close of February was 22,580 ingots, as compared with 19,800 ingots at the close of February, 1872. The deliveries of Banca tin in Holland in the first two months of this year were 13,301 ingots, as compared with 15,695 ingots in the corresponding period of 1872. At Paris Banca, delivered at Havre or Paris, is quoted at 150*l.* per ton; Straits, delivered at Havre or Paris, 150*l.* per ton; and English, delivered at Havre or Rouen, 150*l.* per ton. The continental lead markets have remained without any important change, but firmness has generally prevailed. Zinc has continued to advance upon the German markets. At Paris Silesian zinc, delivered at Havre, has brought 26*l.* per ton; other good marks, delivered at Havre, 26*l.* 8s. per ton; and ditto, delivered at Paris, 26*l.* 16s. per ton.

There is scarcely any change to report in iron quotations in France. In the Comté group fine pig, to be delivered during the year, has been selling at 9*l.* 12s. per ton. The Western of France Railway Company recently offered for competition 6000 tons of old rails; the highest tender received was 8*l.* 18s. per ton, delivered on trucks at Paris. As a consequence of artillery experiments at Calais, it is announced that the Creusot Works have received an order for cast-steel cannon for the French Government. Spiegel pig, the use of which is indispensable in connection with the manufacture of Bessemer steel, has been obtained for several years past from Schisshyttan, near Smedjebokken, in Sweden. The pig is prepared by the treatment of magnetic iron minerals, containing 13 per cent. of manganese, which are reduced to a metallic condition by means of coke imported from England. Notwithstanding the very great cost of the combustible used, the undertaking has been a successful one, the minerals being in the immediate neighbourhood of the blast furnaces. The property was taken over last year by a group of German capitalists. The principal locality for the production of Spiegel pig is now, however, the Siegen district, in Prussia, where excellent minerals, carbonates and hydrates of iron, containing a large proportion of manganese, are worked. The most important bearings are at Stahlberg, Brüche, and Wilderman, near Musen; at Bautenberg, Einigkeit, and Kunst, near Burbach; and Storch, Schoneberg, Honigsmund, Eiseneche, After-Hamberg, Gisberg, Greinberg, Flossberg, Driesbach, and Granebach, near Siegen. The minerals are roasted in special furnaces, and are then cast into pig either with coke or charcoal, or a mixture of both. To produce Spiegel pig the mixture is composed generally of 17 cwts. of roasted Siegen minerals, 6 cwts. of red hematite, 10 cwts. of calcareous matter, and 15 cwts. of coke or charcoal. The cost price of this pig until within the last few months did not exceed 5*l.* to 5*l.* 12s. per ton. In the production of pig, intended to be used subsequently in the manufacture of puddled steel, the charge comprises 11½ cwts. of Siegen minerals, 8 cwts. of red hematite, 3½ cwts. of calcareous matter, and 12½ cwts. of coke; the cost price of this second description of pig has hitherto been about 4*l.* 16s. per ton. In order to obtain good grey Bessemer pig the mixture is formed by one-third of Siegen minerals, one-third red hematite, and one-third of some peculiar minerals of remarkable purity, which are met with in the same district. These minerals are cast with about 42 per cent. of calcareous matter, and require from 1 cwt. to 2 cwts. more coke than is used for Spiegel pig. The fusion temperature should be as high as possible. The pig obtained when it is yet in a liquid state shows on its surface characteristic groups of figures, which are the precursors of crystallisation.

DEEP MINING IN THE SOUTH-WEST OF IRELAND.

Deep mining has long been a problem in the southern part of Ireland. Few attempts have been made upon a large scale, or according to any well-developed and determined scheme to prosecute the research for minerals at depths equalling those in Cornwall and Devon. Why this region and group of rocks should have remained so long unexplored, possessing as it does such proof of valuable metalliferous veins, can only be accounted for through the want of confidence and fixed determination to prosecute to practicable depths those indications normally exhibited at the surface.

The South of Ireland, from Dungarvan and Youghal Harbours; on the east to Cork, Dunmanway; and on to Dursey Head, west of Bantry Bay, on the west, is so important an area that it deserves the attention of all who are interested in the wealth and prosperity of Ireland. The country between Cork Harbour and Dunmanus Bay is almost entirely composed of the group of rocks termed Upper Devonian and Carboniferous slate, and more or less these rocks occupy patches of country on to the Kenmare river on the west. The so-called carboniferous slate divides into a north and south range; the northern spur stretches into and occupies the north and south sides of Dunmanus Bay, its southern branch terminating at Inishbeg, near Skibbereen, forming the east headland of Roaring Water Bay. The point of bifurcation is at Carraghalicky Lake. Thus the whole of the promontory from this point to Crookhaven and Mizen Head is composed of the deeper-seated Devonian slates, &c. Rocks equivalent in time to, or of the same age and character as, the well-known killas of Cornwall. It is this strip of country, with its central ridge rising to 1140 ft. (at Mount Gabriel 1339 ft.), that chiefly claims our attention as being, perhaps, one of the most important copper-bearing districts of the South of Ireland. Broad transverse valleys cut this ridge in two or three places, the chief and most important one being at Ballydehob, which forms the water-shed of Roaring Water Bay.

The Devonian (killas), or Old Red Sandstone, is without doubt the oldest formation throughout the south-west of Ireland; and, according to the maps of the Geological Survey of Ireland, and the memoirs accompanying them, written by the officers of the Survey, it is divided into two groups—1. The Old Red Sandstone at the base, succeeded by—2. The Upper Old Red Sandstone (or Upper and Lower Old Red). The latter is about 800 ft. thick, and near its lower boundary, according to the Geological Survey, occurs the "copper zone," and which would appear to "prevail throughout the whole of the South-West of Ireland."

The earliest known working in this Ballydonegan and Berehaven area was commenced about 30 years since in an east and west vein or lode of quartz and copper pyrites, which was exposed in the cliffs north of Ballydonegan Bay, termed the Allihies old lode, and which appears to have been worked some 50 or 60 fathoms deep. A dyke of greenstone (diorite) runs north and south in the cliff to the west of this vein, and at right angles to the course of the lode.

Other extensive mining operations succeeded, and have been continued down to the present date. In 1860 more than 1000 hands were employed in the Berehaven and Allihies Mines.

It will be seen, then, that the mineral-bearing rocks of the South-West of Ireland occur near or towards the upper part of the lower division of the Old Red Sandstone, or base of the upper Old Red. Cornstones, or calcareous bands, occur throughout the whole series, and these, when impregnated with or containing copper, are locally called "gossan lodes." It is believed that the thickness of the Old Red Sandstone is between 2000 and 3000 ft., although the base nowhere appears to be exposed in this area; the upper 800 feet, according to the Geological Survey of Ireland, being called the Upper Old Red Sandstone.

A series of anticlinal and synclinal curves occur in this region, the chief of which is that which traverses Ballydehob, Skull, Toormore Bay, Crookhaven, &c. The axes of the Ballydehob anticlinal strikes east 25° north, with a general dip to the north-west of about 50°, and to the south-east of 45°, and it is along this that the highest land occurs, being mainly composed of slates and gritty beds of the upper part of the lower Old Red Sandstone. South of this, between Cappagh Lodge and Skull Harbour, and close to Rossbrin Cove, are

situated the extensive and deep copper mines of Ballycummisk, and on the east side of Skull Harbour occurs Coosheen Mine.

We cannot but regard the South of Ireland as a a continuous and integral portion of the South-West of England and South Wales; the variations in rock masses being such as are due either to local conditions and causes at the time of deposition, or, probably, still more to metamorphic action, of the nature of which at present we know but little. But that the lower, middle, and upper Devonian series of North Devon, and the corresponding groups of Cornwall and South Devon (under the name of killas) are of the same age cannot be doubted. The relation of petrological or lithological conditions of the Devonian rocks of North Devon with those of the south and south-western area of Ireland, is remarkable and almost complete. Equally so with the Devonian slates (killas) and grits of North Cornwall, from Tintagel to Padstow, and the great middle group which occupies the country from Trevose Head to near St. Agnes Head, as well as the lower and great copper-bearing killas of the South of Cornwall from Truro to Mounts Bay. These groups of slaty and gritty rocks of the Devonian series in England are represented in Ireland. There are, nevertheless, local differences of high importance doubtless, due to the greatly developed intrusive masses of granite and greenstone, as well as the innumerable elvans which traverse the slaty rocks of Cornwall, and which have, doubtless, aided in the mineralisation of the Cornish killas, imparting to it a character peculiar to itself. All lithological conditions, mineral evidence, and mining experience confirm the belief that the now too widely separated metalliferous areas were once one continuous series.

At Ballycummisk, one of the few mines in which the copper lodes of the district have been deeply and fully developed, and where determined energy has been put forth to grapple with the difficulties of deep mining, no less than eight lodes have been proved to exist. A well-defined elvan course traverses the sett nearly east and west. To the north, and bearing north-east and south-west, occurs the large fault, or flookan course, which deviates about 17° from the strike or bearing of the lodes, and crosses all the veins. This flookan, like the lodes, underlies south, and materially influences the production of mineral at its junction with the lodes.

The Ballycummisk Mine is 200 fms., or 1200 ft., deep, making large returns of ore; the 198 fm. level being now extremely rich in yellow and peacock copper ore, and the enclosing matrix cannot be distinguished from the killas of Cornwall and Devon.

The ores of copper in the South of Ireland are found frequently to highly impregnate the killas, &c., in which they appear in some cases as grey copper, and in others as blue carbonate; but their chief value is under the form of the yellow and peacock copper pyrites.

West of Ballycummisk, and immediately east of Skull Harbour, is situated Cooshen Mine, where no less than eleven lodes have been discovered. All these are east and west lodes, varying in their bearing or direcion from 10° east to 25° north, Seven of the eleven are copper-bearing, containing either yellow, purple, and grey ore, or green carbonate, and underlie or dip south. The sett is traversed from north to south by a cross-course, or fault, accompanied by a parallel and well-determined flookan, which seems to have shifted the lodes. It may be important to state that at 42 fms. from surface, and 16 fms. below the deep adit, the No. 6, or old lode, dipped south 6° in 1 (or 80°), and contained a leader of 7 in. of solid grey copper, the remaining 6 ft. of the lode being composed of quartz, grey copper, green carbonate, and blue peach. Even at the limited depth or shallow working mentioned upwards of 20,000*l.* worth of copper ore has been returned.

It is believed from the nature of the lodes that Coosheen will be carried down to depths equal to that of Ballycummisk, for it cannot be doubted but the lodes of both setts are the same, and all are more or less parallel to the strike of the upper Old Red beds: and such appears to be the law as regards the position and run of the lodes in the South-West of Ireland.

It is believed that the Berehaven and Ballycummisk deep workings will be the means of elucidating much of the physical structure of this area, and aid us in arriving at some general and definite rule or law as to the true mode of occurrence and in-filling of the lodes in the South-West of Ireland, and their relation to those of Cornwall. Much is to be expected from the united forces of energy, ability, and capital as applied to mining in the South-West of Ireland.

THE POLITY OF MODERN MINING—No. I.

SIR,—To a constant reader of your valuable Journal it must appear that the course now being pursued in mine management is different from that relating to every other enterprise. With respect to other enterprises, many of which not half so complicated and arduous as mining is, men are selected for the conduct of affairs on the ground of their supposed superior fitness for the office they are required to fill, and reference is usually had to their past experience as the most unerring criterion of their qualifications to properly discharge the duties which may devolve upon them. Before appointing a person to fill a responsible office in respect of any business but that of mining, it is usual to institute the strictest enquiry as to the experience the individual has previously had in that particular pursuit, and nothing could be more remote from the intention, or incongruous with the object, than to select a person to fill an office whose previous sphere of action had been diametrically opposed to the one requiring to be filled. If habits, which supersede instinct, and are very properly said to become a second nature, are formed, grafted upon the earlier instinctive conditions of life, and which constitutes the distinctive traits of individual character, few persons, if any, should be expected to be found who possess that peculiar versatility of mind which would enable them to forget the old, and to adapt themselves to an entirely new regime with practical and economical familiarity.

In reading the Journal from time to time I have been frequently struck with what appears to me as very strange and incomprehensible proceedings. Disaster has followed disaster in respect of American mines; and though these things come upon us with startling suddenness, which is almost paralising, a moment's reflection is generally sufficient to elicit from one's own mind the involuntary interrogatory answer—How could it have been otherwise. If we take two examples, as furnished in the Supplement to the Journal of March 1—the Emma and the Camp Floyd Mines—it will not appear to be the mines which are at fault but the management. Nevertheless, it is humiliating to find the Chairman of the board of one of the companies publicly saying that gentlemen on the other side of the Atlantic knew better than gentlemen on this side of the Atlantic. We freely admit that if the appointments made by gentlemen on this side of the Atlantic be taken to represent the knowledge of this side then there would, indeed, be extreme difficulty in rebutting the statement that that gentleman has made, but as it is no such difficulty exists. Experienced Englishmen who have travelled in America know sufficiently well the discrepancies which have arisen in respect of mining there arose from other causes than that of a superiority of practical knowledge on the part of the American. What could be expected from persons entrusted with the management of mines who when disaster befalls them frankly admit that they never knew anything of the business but what their subordinates had told them. The writer of this knows that there are men in this country in whose presence the most popular professors of the Pacific Coast would dare make but very slender pretensions to practical mining, and express themselves, if at all, on any points relating thereto with unaffected diffidence.

If *tools* are engaged for certain purposes, which other men would deem it derogatory to themselves to perform, let not such men be branded with the calumnies due only to designing operators. It has excited the ire of Englishman abroad, and conduced largely to profanity their witnessing the pliability of the representatives of their country, and their country's capital, submitting and subscribing to the wily propositions of the cunning and deeply designing American speculators, whether in offering himself for office to attend to the company's affairs without any remuneration, therefore thus making it to appear as a special favour, made only in the interests of the English capitalists, for we never hear of any such extraordinary generosity being manifested to others, or in recommending as a good and useful man to manage the mines some veritable factotum of his own, pledged beforehand to work in his interest, at the company's expense—an *expert*, indeed, but whose energies are devoted to sinister purposes, and diametrically opposed to the interests of those whose paid agent he is. It is much to be regretted that the English are so confiding, and so prone to give credit to other nationalites for being actuated by motives so pure in their business relations as their own, and to take it for granted that self-respect is as general and patent with the foreigner as it is with the English-bred gentleman.

Self-respect abroad is, so far as I have ever seen, subordinate to self-interest, and even morals must accommodate themselves to its imperious demands. What, then, should be the policy of Englishmen in their relations with all foreign enterprises? Why, surely nothing less than the taking the exclusive management and control of their affairs into their own hands—the chief and all subordinate offices. If such had been done in respect of all American mines, and soundly experienced men had been chosen first to advise as to their value, and, secon', as to the mode of their practical working and development, we should not now be witnesses of the lamentations of so many over disasters which have befallen them. It is not of necessity that they have occurred, but because due care had not been exercised by investors in their purchase of the mines and their subsequent working. It is surprising that the rapid increase of failures which are occuring from this cause do not appear to have the least effect in checking or abating the evil, but in proportion as they accumulate, seems to be the impetuosity of the course pursued in the same direction, and, instead of betraying any hesitancy in respect of such action and its consequences, the speed appears to have been accelerated, as though an increase of its velocity could outrun the evil and avert its consequences. ANGLO-SAXON.

THE GEOLOGICAL MAP OF VICTORIA.

SIR,—Referring to the letter from Mr. Alfred R. C. Selwyn, published in last week's Journal, it appears right, in answer to that letter, to give exactly the title of Mr. R. Brough Smyth's Map, which I think completely removes every cause of complaint on the part of Mr. Selwyn, or of any of the officers of the late Geological Survey of Victoria. The map now before me is entitled a "Sketch of a New Geological Map of Victoria. By R. BROUGH SMYTH, F.G.S., Assoc. Inst. C.E., &c., compiled from surveys made under the direction of A. R. C. Selwyn, by the surveyors formerly attached to the Geological Survey Department, and from surveys made by the officers of the Mining Department and others. Published by direction of the Hon. Angus Mackay, M.P., Minister of Mines." In addition to this there is a note: "The map should be read with the notes in the pamphlet descriptive of the rock formations. The notes show in what manner it has been compiled, and names the authorities on whose observations it is based."

I think if Mr. Selwyn had read this he would not have penned the concluding paragraph of his letter. A MINER.

March 10.

McKEAN'S ROCK DRILLS.

SIR,—In reply to your correspondent "Delta" (in the Supplement to last week's Journal), I beg to state as follows:—

1.—Weight of machine without stand: large size 1½ cwt., small ditto, 1 cwt.
2.—Length of drill: 38 inches.
3.—Diameter of piston: 4 inches; length of stroke, 2 to 4 inches.
4.—Strokes per minute: 500 to 1000, *ad libitum*.
5.—Pressure required: 25 to 75; average, 50 lbs.
6.—Advance of drill: automatic or by hand, but where only one machine is working the hand is preferable, for it obliges the miner to pay attention and see that the drill advances regularly.
7.—The nature of the stone varies: we have lime, chert, and grits of every degree of hardness.
8.—Diameter of water-wheel: 38 feet, 28 would have done as well; buckets 4 feet wide; breadth of water trough 2 feet; depth of water varies with the supply from 3 to 8 inches.
9.—Compressor wet: a half-inch pipe carries the water up the level and squirts the water with great force into the holes and keeps them quite clean.
10.—Dimensions of level: 6 feet high clear of the rails, and about 5 feet wide.
11.—The air pipes are two inches in diameter, but I think one inch would be sufficient.
12.—The level forehead is now nearly 400 fathoms from the compressor; the ventilation excellent, the air being as good inside the mine as out.

I may state, in conclusion, that with a single hole 4 ft. 6 in. deep, in the centre of the level, with a charge of dynamite equal to 4 lbs. of powder, they got 28 cubic feet of stuff out. My old machine is getting shaky, but in another fortnight I hope to have one of the new ones at work, which are far superior. The dimensions above given are of the new patterns. I have three columns of different lengths—*i.e.*, 2 ft., 4 ft. and 6 ft.—for fixing the borer in its place, which they do with extreme rigidity. But they are unnecessarily heavy, especially so for the new machines. GEO. WM. DENYS.

March 11.

DYNAMITE—McKEAN'S ROCK DRILL.

SIR,—Some four or five years since I tried Nobel's Dynamite as a blasting agent in the limestone rock of North Staffordshire, both in quarries and underground. There can be no doubt about its efficacy when properly used, and since the Metalliferous Mines Act has come into force it is by far the cheapest blasting agent, as it completely does away with stemming or tamping the holes for which it is used, and does not require what the new Act does—copper stemmers, &c., which are really expensive, and water or loose sand being (as I find) the best stemming or tamping for it. It is greatly to be regretted that such a valuable agent should be so restricted by persons who practically know little or nothing about its valuable uses. It is now almost an impossibility to get any in this district (through the favour of Mr. Bruce's Bill). I think, if Mr. Bruce had been in any way connected with quarrying or mining, and in which dynamite would have been of great assistance to him, he would have been the last person to oppose so strongly the transit of so valuable a blasting agent. I am glad to see several gentlemen are now taking up their pens in defence of this, also in strongly recommending boring machines, such as McKean's Rock Drill, which must in time considerably economise and lessen that laborious and tiresome work of boring with the drill and hammer, though prejudice here, as in other places, takes no little time to overcome. I think Sir Geo. Wm. Denys deserves the thanks of the mining world for advocating so strongly the usefulness of dynamite and rock drills.

Ashbourne, March 12. R. N.

IMPROVED ORE HEARTH—FUME CONDENSER.

SIR,—Can any of your intelligent correspondents give me particulars of the construction of Johnson's Improved Ore Hearth, as used at the W. B. Lead Works; and whether this hearth has anything to do with the preference and the high price always given for the W. B. lead?

It is said not to require repairs for years; that it works continuously through the week at a temperature always quite under command; it economises fuel; and that it will smelt ore of any quality, producing lead very quickly, and of great purity. At the same time, I hear that so far as the construction of the hearth can be ascertained it has been tried elsewhere; but—as some secret about it has always been kept back—not with the same amount of success as under the inventor's superintendence. I am also told that Mr. Johnson has invented a Fume Condenser, which is in use at these works, and that it far excels anything before tried for catching metallic and other vapours. Perhaps they will inform me on this too.

Surely economy in these times of high prices of fuel, iron, and labour, and the utilisation of waste products is a great desideratum, especially when lead keeps comparatively low in price; and it is a great pity that Mr. Johnson—as the agent of a liberal member of so much wealth—should be so conservative with his inventions, and that he should prefer not being known to the world of fame as a promoter of practical science, as strangers are not allowed to enter the works now, or to know what is going on, as they did in former years.—*Newcastle-on-Tyne, March* 11. EXCELSIOR.

MINE INVESTMENTS, AND REDEMPTION OF CAPITAL.

SIR,—In the *Mining Journal* of Oct. 25, 1862, I brought this subject before your readers in a letter in which I stated that "the high prices paid for some of the leading mining shares were, in my opinion, not justifiable, when redemption of capital and the precariousness of the dividends are taken into consideration," and by way of example (not depreciation) I noted five mines, which, mines, after a lapse of 10 years, or thereabouts, by your kind shall again refer to.

1.—DOLCOATH MINE was then selling for 525*l.* per 256th dividends were being paid at the rate of 42*l.* per share per and would have to continue to pay the same rate of dividend 20 years to pay a purchaser 5 per cent. on the purchase money redeem the capital, or the amount paid for the share (525*l.*), *investing* annually, for 20 years, the difference between the cent. as purchase money, and the dividend (*i.e.*, 42*l.* less 26*l.* 15*l.* 15s., at 5 per cent. compound interest. Since 1862 Dolcoath shares have been multiplied, first from 358 to 1432 shares; and 1872 (according to the Journal) the shares were again multiplied into 4296. Taking the dividend in 1862 at 42*l.* per 358th share gave a total for the year of 15,036*l.*, and by the Journal the dividends in the year 1872 have been 10*l.* 12s. 6d. per share, giving, I am *correct*, a total dividend for the year 1872 of 45,644*l.* 18s., so Dolcoath in the 10 years seems to have improved, but the 20 years are not passed yet.

2.—DEVON GREAT CONSOLS, in October, 1862, were selling at 500*l.* per 1024th share (in 1864 they rose to 600*l.*), with an annual dividend of 50*l.* per share per annum, and I intimated that the present rate of dividend would have to be paid for 14 to 15 years to pay back the purchase money, by re-investing, as in Dolcoath, and pay 7 per cent. on the purchase money; 50*l.* per annum on 1024 shares gave a total dividend for the year 1862 of 51,200*l.* The total dividend in the year 1872, according to the Journal, is 6*l.* per 1024th share, a total of 6144*l.*, as against 51,200*l.*, or thereabouts, in 1862; and the end of the year 1872 the shares were quoted at 70*l.* to 75*l.* per 1024th share; the shares have, during 1872, been multiplied into 10,240, and the quoted price at the end of 1872, 7*l.* to 7*l.* 10s.

3.—SOUTH CARADON stock at 430*l.* per 512th share in 1862 the rate of dividend 30*l.* per share per annum, and I estimated the mine would have to continue paying the same rate of dividend for 25 years to enable a purchaser to redeem his purchase money and receive 5 per cent. interest on the said purchase money, by investing the surplus (above the 5 per cent. interest) at 5 per cent. compound interest. According to the Journal this mine gave 24*l.* per 512th share in 1872, and the shares at the latter end of the year were quoted at 170*l.* to 180*l.*

4.—EAST CARADON shares in 1862 were selling at 46*l.* per share, and paying dividends at the rate of 4*l.* per 6144th share per annum, and would have to continue paying the same rate of dividend for 17½ years to enable a purchaser to receive 5 per cent. interest on the purchase money, and redeem the said purchase money by re-investing the surplus (above 5 per cent. on purchase money) at 5 per cent. compound interest for 17½ years. The shares are now selling at about 4*l.* per 6144th share.

5.—WEST WHEAL SETON shares in 1862 were selling at 36*l.* per 400th share, and the rate of dividends was taken at 30*l.* per share per annum, which rate of dividend would have to continue for 11 years to pay purchasers 5 per cent. per annum on 260*l.*, and redeem said purchase money, by re-investing annually the surplus (above 5 per cent. on 260*l.*) at 5 per cent. compound interest. In 1863 the mine divided 20*l.* per share; in 1864 and 1865, 24*l.*; in 1866, 28*l.*; in 1867, 20*l.* 10s.; in 1868, 31*l.* 10s.; in 1869, 32*l.*; in 1870, 24*l.*; in 1871, 15*l.*; and in 1872, 9*l.* per share, or an average of 22*l.* 10s. per annum over the 10 years 1863 to 1872 inclusive. No dividends have been paid in December, 1872, nor February, 1873. The shares are now quoted at 37½*l.* to 40*l.*

We have, therefore, with the exception of Dolcoath, a great falling off in the dividends and price per share in all the mines I named in my letter of Oct. 25, 1862. In the concluding part of that letter I stated as my opinion that the "price per share should not exceed that upon which the dividends will give an interest at the rate of 20 per cent. (five years purchase as a perpetuity) to cover all risks and redemption of purchase money. In the Journal of Nov. 1, 1862, "Inquisitor" replied to my letter of Oct. 25, 1862—

"I appeared to have fallen into a singular fallacy in my theory of the market value of mines. For instance (he says) of Devon Great Consols continuing to pay the same dividends as now for 14 or 15 years an investor at the present price would get 5 per cent. interest, and be enabled to redeem his capital by laying out the annual interest at 5 per cent. compound interest. But, Sir, he forgets that at the end of that time the shares will be of the same market value as now, as the time will, on the hypothesis, be paying the same dividend as now, &c.; so, in fact, an investor would get his 5 per cent., and not only redeem but double his capital."

But in that letter "Inquisitor" thought proper to misquote the words of my letter of Oct. 25, 1862, by making me say, "if Devon Great Consols continued to pay the same dividend," instead of what I did say, "*would* have to continue paying the same rate of dividends for 14 or 15 years to come," &c. "Inquisitor," in his letter said "that a mine is generally considered worth seven years purchase, and upwards, according to its prospects. My reply to "Inquisitor," appeared in the Journal of Nov. 8, 1862.

In the Journal of Nov. 29, 1862, there appeared a letter from "Cautious Man," I believe), who, in alluding to my letter of Oct. 25, 1862, as to Devon Great Consols and South Caradon, and my observations as to 5 years purchase, says:—

"I tell him that such mines are better worth 20 years purchase than some one I could name are worth five years purchase, and this every man who has mining must know as well as I do. That the latter mine (South Caradon being too high I readily admit, but to compare such mines with the generality of other dividend mines, and to value them with others at only 5 years purchase is preposterous. My opinion is that Devon Great Consols and South Caradon will be good dividend mines for at least 20 years to come, and that each of them is worth 10 years' purchase. There is no such other mine in the world as Devon Great Consols, nor is there any mine in the world better managed. Five years purchase, indeed, for such mines, I repeat, is preposterous."

Now, Sir, we find that both "Inquisitor" and "Cautious Man" admit that the prices of the mines I named in 1862 were too high, and if both these writers are still amongst your readers I would ask them what they now think of my theory of the market value of metallic mines in general when they find Devon Great Consols quoted at about 80*l.* per 1024th share, and South Caradon at about 200*l.* per 512th share, and from where the parties that bought at 500*l.* and 430*l.* respectively are to look for their 5 per cent. on the purchase money and the redemption of the same? That I am not singular in my views I may refer to a letter signed "Typhoon," in the Journal of Feb. 9, 1861, page 83 (noticed in my letter in the Journal of Nov. 8, 1862). "Typhoon" puts the "usual calculation (of the value of metallic mines) at six years' purchase." As no one with any wisdom would consider "his principal safe until it had been returned in dividends." "Typhoon" at that time put the market value of Devon Great Consols at 189*l.*, instead of 410*l.*, the price the shares were then selling at. And, again, Mr. A. Bennetto, in the Journal of July 16, 1870, page 607, under the head of "Mining Legitimate and Speculative," says:—

"The great curse to all legitimate mining is that some persons appear to have the gift of writing up fictitious things that read exactly like truth. During the last century and a half all legitimate mines wrought in Cornwall were estimated at four years' purchase on the amount paid yearly in dividends," &c.

In conclusion, I would beg to repeat what I said in my letter of Nov. 8, 1862:—

"My observations are not intended to depreciate any mine in particular, but to draw attention to the subject, so that investors may not go on under the delusion that they will receive the large dividends and live upon them *ad infinitum*, or even for 21 years, and then be able to sell the shares at the price they cost."

I believe few speculators think, in its proper light, of *redemption of purchase money*, in purchasing shares in metallic mines and every other property, or even the means by which redemption can be realised. There are numerous Tables published wherein the yearly purchase is given, but on the assumption that a purchaser will make any rate of percentage on his purchase money from 2 up to 10 per cent. (Tables from 10 to 20 per cent., I believe, are not published), with redemption of purchase money in any number of years from 1 to 100. But it must be borne in mind that those Tables are

culated on the assumption that a purchaser can re-invest the plus dividend or annuity (above the interest he wishes to make his purchase money) at the same rate of interest—*i.e.*, suppose per cent. is expected to be made on the purchase money, then the investment of the surplus should be made at 10 per cent. compound interest for the number of years the dividend is expected to ure, which, one may say, is almost impossible. In "Willich's ular Tables" (Edition 1872, Table 15) the number of years purse is given to pay a purchaser 5, 6, or 7 per cent. interest, and restments at 3, 3½, 4, and 5 for redemption.

My opinion is that redemption can only reasonably be calculated by re-investing in the Three per Cent. Consols. But in my letter Oct. 25, 1862, I assumed that re-investments for redemption could made at 5 per cent. compound interest. Had I calculated reemption at 3 per cent. then Dolcoath would have had to continue same dividend as there named for 23½ years; Devon Great Con-, 16 years; South Caradon, 31½ years; East Caradon nearly 21 s; and West Wheal Seton, 13 years.—*March* 10. S.

FAVOURITE INVESTMENTS.

SIR,—During the present year we are likely to witness an investnt of a considerable amount of capital in Welsh lead mines and colliery companies. And it must be confessed the public have y inducement for embarking in these two species of investment. wonderful success achieved by the Van and Van Consols, in Montgomeryshire; by Minera and Denbighshire Consolidated, in Denbighshire; and by the Lisburne Mine, Cwmystwith, West Esgair Lle, at West Van, &c., in Cardiganshire, ought naturally to powerly direct the attention of capitalists to this department of our ional industry; and the enhanced price of lead and blende in the ket tends to impart additional vigour to the movement towards Principality which has set in with such force. Let the investing munity abstain from supporting mines where large sums are anded by the vendors, and where water-power is present sufficnt to do away with the necessity for employing steam, and we persuaded it will have no reason to regret giving its co-operation ards one of the profitable mediums of investment. The mines Cardiganshire are especially worthy of attention; the mineral lth of this county is well known to your readers. For centuries district has been worked at shallow depths, and the results have formly been such as to return large profits. Now, however, when requisite capital is forthcoming, and when improved mining wledge and appliances are available, these returns will not merely equalled but greatly excelled. It is a maxim in mining that deeper you mine the better the quality of mineral extracted; and the mines of Cardiganshire are prolific in lead ores at far greater ths than the generality of them have yet been worked, is abunntly proved by the fact that in no one case have extended operas failed to re-emburse the adventurers. It has always been surface osits that have proved the precursors to far better defined lodes greater productiveness at deeper levels; and the mines worked the Messrs. Taylor are cases in point. These are the only deep *mines in Cardiganshire*, and these are the best paying; while the erality of the mines do not exceed a depth of from 20 to 30 fms. t Darren, amongst others, is now 280 fms. in depth, and shows signs of falling off; the ore, in fact, holds good right from surface. The Tyllwyd Mine is thought highly of in the neighbourhood, but it is only about 5 fathoms deep from the adit; below this depth mer workers were unable to sink, owing to the water. Destitute capital, and of the most primitive appliances, they could do no re than scratch the surface, and even under these disadvantages y made large profits. The new company starts with a capital of 12000*l.*, in 1*l.* shares (payable in easy instalments), will immediately ct the most approved machinery, and will at once begin to work on a most promising and highly mineralised lode, now standing the bottom of the shaft. There is no question but that large rens will be made from this point alone in a few weeks, while ther equally promising points of operation will not be neglected. r is the incoming capital swamped in an undue measure by exvagant terms of purchase. The character of the sett is such that superior property could hardly be found in the kingdom, but the whole amount paid to the vendor is 5000*l.*, and of this amount no s than 3000*l.* is taken in shares. Thus the interests of the vendor re rendered identical with those of the shareholders, who find the maining 7000*l.*, which is considered by Mr. Walter Eddy (who mined the property on behalf of the directors), by Capt. Trenhan, and by Capt. Williams, more than ample to place the mine a permanent dividend-paying condition. There is now on the perty a vast quantity of wastes left by former workers, which are ued at 4000*l.*, and which can be made marketable at an expendire of 2000*l.* This fact removes the success of the company from e category of speculation; as, in addition to the above handsome fit, which in itself would pay a very large dividend, it proves the alth of the mine at a depth less than 5 fathoms from the adit, the sent utmost depth of the workings. The splendid water-power the River Rheidol—available at all seasons of the year, renders the mpany independent entirely of steam-power, and this alone will ect a large annual saving. The direction is more than usually of high-class character, and cannot fail to give confidence, and the t that they have each embarked their own capital freely in the erprise evinces clearly their high opinion of the merits of the dertaking. Before asking the public to subscribe a single shilling, d despite the satisfactory reports from independent mining enneers placed before them, they unanimously came to the conclun to have an entirely fresh report for their guidance made by a n of their own selection. They choose Mr. Walter Eddy, the neral surveyor to the Marquis of Bath, and his report (now before e public) was so satisfactory as to induce them to appeal to the blic for subscriptions. We forbear making further remarks than call the attention of your readers to the following entirely indendent report made for an intending shareholder, which fully corborates the opinion of all who have inspected the mine:—

"This mine is situated about one mile south of the celebrated Old Goginan Mine, ose merits for the last 40 years need no comment. About two miles further th lie the old established Frongoch Mines, to which the same remark may be plied as to Goginan. In the Tyllwyd Mine there are three parallel lodes. On south lode only 30 fms. in length have been worked. In all this drivage ore been produced. About 12 fms. of same have been stoped above the level, and far below as hand power would admit (about 6 fms.), leaving a good orey lode bottom. At the western end of these workings a shaft has been sunk about fms. from surface (this is the deepest point in all the mine). This shaft was nd to be 8 fms. 3 ft. deep, and containing a lode from 1 ft. to 1 ft. 6 in. wide, ducing about 15 cwts. of lead ore per fathom. We sunk this shaft about 3 fms. er, when the lode increased in size and value, and is quite as good now as ever. ight here remark that from the 3 fms. we sunk we dressed 2 tons of the best with the bucking hammer, and a great deal of coarse stuff lies on the flooring e. I need scarcely remark here that this lode extends all through the sett from half to three quarters of a mile in length.—Middle Lode: This lode is intered by a cross-cut north, 14 fms. from the same point on surface as the south e. Over this level the ore ground is principally taken away, with the exception some stopes, one about 30 fms. long, which is capable of yielding immediate rens, together with one or two shorter ones. The levels on this lode should be shed on eastward, in order to lay open fresh deposits of lead ore. Nothing has n done below this level on the bunches of ore except in one place about 5 fms. p. From the above bunches of ore over this level some thousands of tons have n raised and dressed by hand-power (no crusher ever on the mine). And I re no doubt, if properly developed, it is still capable of yielding immense quanties of silver lead ore. The north lode is entirely new in the sett, and has only en worked on east about 8 fms. When first cut it was only 6 in. wide, and by nding on its course it has gradually become stronger, and is now from 2 to ft. wide, containing spar and clayslate, and impregnated throughout with lead re. I may mention here that this present end is only 7 or 8 fms. from surface, and by being pushed on will gain ground to the height of 90 fms. I consider this be a very important discovery in the property, as it can at any time be reached cross cuts from the middle lode, for which one is already started from the deep vel, and is within 12 fms. of cutting it. In conclusion, I beg to say, considering the locality in which the mine is situated, the lead ore already obtained, the present prospects of the three lodes, having ample water-power available for all seasons of the year, with every convenience for carrying on extensive mining operations with small outlay, the above property will soon take a prominent position with the leading mines of Cardiganshire."

Amongst the other lead mining properties in Wales making great progress may be mentioned Van Consols, Denbighshire, and West Esgair Lle, which are each well deserving of support, and, without question, will ere long pay good dividends to the shareholders. With reference to Tyllwyd it is but right to mention that already the whole capital is nearly subscribed, and intending applicants must not look to receive more than a small proportion of the shares applied for.

In Colliery Companies the public have another excellent medium of investment afforded. It is idle to expect that coal will ever again sink in value to the prices current a year or two ago, and although present quotations may fall a point or two a marked advance on the average price current before the late rise will be permanently established, despite Royal Commissions and popular outcry. Colliery companies have ever proved highly profitable speculations, as your Share List shows; but, with the higher price for their produce now obtainable, it cannot be doubted but that they will make still greater profits. The Clee Hill Collieries are among the most promising of this class of investments. They are now in full working order. It is estimated, on the basis of the low prices of a year ago, that the shareholders will receive an annual dividend of 50 per cent. Nor are they dependent for their income on coal alone. The property contains almost inexhaustible quantities of ironstone, fire-clay, brick-earth, and dhu stone, for which a ready market is at hand. The colliery is also provided with ample railway accommodation, which, when the output is increased, will be a matarial advantage; but all now produced (some hundreds of tons per week) is sold at a handsome profit on the spot.

If investors will take due precaution to ascertain that the interests of vendors are identical with their own, and that the management is entrusted to practical, and at the same time trustworthy, hands, they will have no cause to repent embarking in Welsh lead mining and colliery companies; but if these essentials are neglected failure will result, as in other departments of commerce.

Gresham House, E.C. —— HARLAND AND CO.

PROFITABLE HOME MINING.

SIR,—What is in a name? All the world must admit an El Dorado is a prize; to follow that prize you must, as men of business, lead the Van, and the Van will go straight, capitalists may depend upon it. The El Dorado is not in Grass Valley or the Salt Lake, but the mountains and valleys of the Van; here you will find untold wealth, waiting only the purse strings of the sluggish investors and capitalists. Go to the Van and gather wealth, wealth untold, and the everlasting El Dorado; but do not invest in Salt Lake or the Grass Valley mines in future, where the foreign gentlemen eat up the cream of these rich mineral valleys, but for a time stay at home and invest in the old family—the breed is good, and ought to be encouraged.

Home industry has always proved the most prosperous after all, as past experience shows, and the greatest fortunes have been made by men investing in local speculations. Men of the greatest experience will, I am sure, endorse these sentiments. The old Pant-y-Go Mine, in Flintshire, yielded a profit of from 50,000*l.* to 80,000*l.* annually for 16 years. What foreign mine, with an outlay of 3200*l.*, has done equal to this mine? But Pant-y-Go's are of the past. Now are the days of the Van; so investors should invest all in the Van family, for the good of the ancestry and old family connections. We are told that a good name is a precious jewel, and all jewels ought to be precious. Taking all the investments in mines for the last 20 or 30 years, what description of mining has been equal to our native mines as a speculation or as an investment? I started three copper mines some years ago, with an outlay in all of about 18,000*l.*; in seven years the capital was recouped, and 160,000*l.* paid in dividends. These three mines are selling in the market at 300,000*l.* A. BENNETT.

March 11.

[ADVERTISEMENT.]

ON TIN STAMPING AND DRESSING.

SIR,—Having finished my former remarks, I have now to ask you to publish the following:—N. Ennor begs to inform tin miners in want of stamps that he is now ready to engage with such parties for the erection of stamps on his improved principle, with all falling heads of any required weight, and to erect a cheap crusher, worked by the some machine; he will lay out a dressing-floor with jiggers to catch the hitch tin from his proposed rough grates, and to erect a round griddle to take in all the waste which passes the jigger, and separate the slime from the rough, the slime going to one buddle and the rough to a second, without any handling; and also to fix squatters' frames to proper pitches to catch the different quality tin, by which he hopes to show whether tin of value goes to sea afterwards. N. ENNOR.

36, *Hyde-street, New Cross, March* 5.

SLATE QUARRY MANAGEMENT.

SIR,—I was much pleased to see "A Practical Quarryman's" letter in the Supplement to last week's Journal; it is a subject which all who are interested in slate quarries should look well into, especially of those worked by limited liability companies. The number of them ruined by bad management is enormous. True, it is some of the quarries could never pay, even with the best of management; indeed, they are not got up with a view of paying the shareholders, but the promoters. Other quarries, again, with unlimited quantity of rock of unsurpassed quality, and with every convenience for successful working, if managed by thorough practical men, would make very large returns. But no! directors and managing directors, who have never seen a quarry before, must do all this; they are shrewd, clever men, and can see a deal further than any Welshman. They begin to spend in good earnest, opening tunnels, sinking everywhere and anyhow, with what results many poor shareholders must know to their sorrow.

I will mention an instance of this kind—The quarry is situated on Moel Siabod, in Carnarvonshire; the width of the vein is 400 yards of the very best rock, and with every facility for working. Practical quarrymen who have seen it say they have never seen anything to equal it in Wales. Having worked in it myself for nearly six years. I can safely say that with good management in a few years it would become one of the most successful quarries in Wales. Yet this invaluable property is being left to the whims of gentlemen who were never in a quarry in their lives before. Surely it is high time shareholders in slate quarry companies bestired themselves ere their money is all squandered. I trust these few remarks will have effect in helping to bring about a better state of things in slate quarries.

Bryn Moel, Capel Curig, March 12. ROBERT WILLIAMS.

THE CARDIGAN AND MONTGOMERYSHIRE MINES, AND THE FACILITIES FOR WORKING THEM.

SIR,—At the present time one of the, if not the, most important of all questions to be gone into is this—Is water-power available for the effectual working of your properties? For with the present exorbitant price of coal, and, in fact, the difficulty of procurit at any price, there are not many of the deepest of the Cornish mines can pay. Neither will parties be found to rush very hastily into the trial of any new properties where very expensive steam-engines are required.

My object in addressing you is to point out the great advantage of mines situate in these localities, where I may state that seven-eighths of the whole of the mines in Cardiganshire can be effectually drained, the stuff drawn to surface and made marketable by water-power; and in the Montgomershire district by far the greater portion of them possess equal advantages. Look, for instance, at the great discovery at the Van Consols, made during the past few days, and compare the cost of working with a mine that would be able to return a similar quantity of ore monthly in either Cornwall or Devon, and, in fact, in nearly every other district in the kingdom, and the result would be incredible.

In these two counties, also, not only is water-power abundant, but the trials in all and every instance can be made cheaply by driving in adits, generally on the course of the lodes, which adits commence near the base of a hill, in most instances terminating with backs of at least 100 fms. high, and in many places as much as 200 fms. are to be obtained. Another great advantage is that the lead ore makes near to surface, and the lodes are of very great size, varying from 6 to 120 ft. wide. The richness of these counties so fully speaks for itself that any comment were superfluous.

Too much care and attention, also, cannot be bestowed upon the preservation of water, and getting all the power out of it that it is possible to obtain; and I am convinced that in some of the greatest mines we have in almost every district, were proper precautions used, in many instances the water pumped to surface by steam-power could be made use of, so as to cut off a considerable portion of the work now done by steam. And if this should be the case, it behoves everyone to look around, and put every gallon of water to its proper use.

In making these remarks I may state, what I have very often remarked before, that in these two counties there are lead and silver enough to last and supply the half of the world for centuries. And it is most earnestly to be hoped, with the great facilities named, and which cannot be disputed, that capital will flow in to prove some of the known rich ground now standing idle throughout the two counties.

I may safely say capital was never more wanted than now, and never presented such chances for obtaining successful results; and should this letter have the effect of bringing in a little of it it will obtain the object fervently desired by— ABSALOM FRANCIS.

Goginan, Aberystwith, March 10.

INVESTMENTS IN WESTERN AMERICA—No. III.

SIR,—The second class of artificial methods by which it is proposed to protect the public from the making of bad bargains relates to the conditions of purchase rather than the price, and on that account must be delusive. Curiously, the two methods chiefly relied upon are of the most opposite character, for one proposes to pay for everything mainly in cash, and the other mainly, if not exclusively, in shares. The first is practically embodied in the rule of the Stock Exchange, which provides that at least two-thirds of the nominal capital of every public company shall be subscribed by the public; and the second is the panacea of the *Times* in the City Article, of which we are continually warned against paying anything in cash, and invited to support every scheme where the vendors are content to take their interest in shares. The rule of the Stock Exchange was primarily intended to prevent the traffic in fictitious shares, and to secure to the public a genuine interest in the enterprises submitted for public subscription. But the raising of so much as two-thirds of the capital in cash practically ensures cash payments for the properties purchased, and no one will deny that the tendency of such payments is to promote caution in making purchases, and to increase the sense of responsibility with regard to future management. This rule says, therefore, to the public, as clearly as any artificial rule can do, be careful to look to the reality of the property you are about to buy, see that you put a right value upon it, examine well the economical conditions and the future prospects, suspect the vendor whilst your money is still safe, see that you get complete possession and acquire satisfactory control over it hereafter, and be prepared to blame no one but yourselves if you should you be taken in.

If a bargain be really sound and good, the shorter the process of purchase the better is it for all parties. Delayed payments, and the introduction of conditions relating to the future, are only calculated to give rise to disputes and lawsuits. No one in his senses would propose to buy an estate on the condition that the payment should be made to depend upon its feeding so many cattle, or yielding so much corn; and no vendor having to take his money in future results would agree to give up possession and management. In such a case the purchaser ranks with those who pay beforehand, said to be as bad as those who never pay at all; and the vendor either parts with his property for an inadequate consideration, or only makes a pretence of sale. The rule of the Stock Exchange also provides in a very practical way that no vendor shall retain the control of the property he transfers to a public company, and if he take part in the future management he does so either in a subordinate capacity or as a paid servant.

Whilst, however, it must be acknowledged that this rule is sound in principle and wholesome in action, yet it should not be forgotten that it is artificial in character, and not essential to a really sound bargain. It is obvious that no restriction as to the terms of payment will alter the consequences of a really bad bargain, nor would they altogether destroy the advantages of a really good one; and the success of an enterprise does not depend upon the public taking the whole of it, since it is quite possible to conceive that the purchase of a part might in some cases be more advantageous than the purchase of the whole. Hence we arrive once more at the conclusion that it is to the price, and not to the conditions of payment, that the public must look for protection against swindles and wild-cat schemes.

The proposal of the *Times* to pay for properties exclusively in shares is founded on totally different principles. It assumes that the vendor is, or may be, a swindler, and that you will have frustrated his villany by giving him shares instead of cash. The suggestion being that if the shares prove valuable the vendor will be fully paid, and if valueless that he will get nothing for his pains. The whole tendency of this arrangement is to shift the responsibility for the goodness of the bargain from the purchaser to the vendor—a principle entirely opposed to the transaction of sound business. The mere proposal to take payment in shares, so far from being a test of honesty, ought to be regarded with the greatest suspicion of dishonesty. If the property be a really good one it is probable that the vendor has himself paid cash for it, and, if so, he is scarcely likely to part with it for shares which may be rendered valueless by the ignorance of directors, over whom he has no control. Nothing can be more dangerous than to encourage the public sale of properties not considered worthy of being paid for in cash, and the examination of a few cases both in England and America will prove that properties offered for sale with the special approbation of the *Times*, and to be paid for exclusively in shares, belong to the very worst sort of investments.

A few months ago the formation of a company was announced in the *Times* for the purchase of a valuable property, in which the profits are estimated at 95 per cent. per annum, and which the vendor agreed to take the whole of the purchase-money in shares. A few days afterwards it was pointed out that the profits were hypothetical, and the taking of the purchase-money in shares valueless unless the vendors agreed to hold them. This they promised to do: but in the end this restriction was only applied to one-third of the vendor's shares for one year. At the first meeting of this company it transpired that the vendor had no *bona fide* interest in the property, but had simply made a lease for the purpose of re-selling it to the company, and for this lease no consideration had been paid. It also transpired that the property was not what it was described to be, having been already worked; and in consequence of this discovery an attempt was made to wind-up the company, and return the money to the subscribers. This attempt failed mainly because the vendor had already distributed a large number of shares to the promoters and other friends, so as to command a large majority at the meeting, and out-vote the *bona fide* subscribers. Whilst the latter found themselves powerless to wind-up the company, because the vendor's shares would rank equally with theirs in the distribution of the assets. The vendors in this case played at the game of "Heads I win, tails you lose," and they have forced the subscribers to go on with the enterprise whether they would or not.

But the paying for American properties in shares is surrounded with even greater dangers. I encountered scores of proprietors who were ready to part with half their interest in mines on the condition of money being found to work them. If the concerns were really sound, and the conditions of partnership and control really equal, there is no possible objection to such an arrangement. But in the majority of cases it will be found that immense sums had already been expended in the vain hope of profit, and that the prospect of the profitable employment of more capital was extremely bad. Thus, for example, a company of New York capitalists have recently contemplated the raising of a large sum of money in England for the working of a Colorado silver mine. They comply most exactly with the requirements of the *Times*; they ask for no cash payment for their property; they will take all they want in shares, which they agree to hold; they propose that every penny shall be spent in developing the property. The advantages present and future are set forth in an elaborate pamphlet, and there is to be a community of interests between Wall-street and Thogmorton-street, which promises the inauguration of a new era in American investments. Would anyone believe that $1,000,000 had already been spent on this property, that the manager had died from broken heart and the loss

of all his capital, and that the shareholders have never received a cent of dividend? Is it not probable that the English capital would equally be wasted? But, even granting that the expenditure of more capital would produce a favourable return, it must not be forgotten that it is most difficult to share the responsibility of management on equal terms. The people living in the country have the advantage; they will have the practical supervision of the expenditure of other people's money—a state of things not conducive to economy.

Besides, the proprietors of mines have many other motives for obtaining money than the legitimate development of their properties. They want to be managers. They have the opportunity of engaging labourers, making contracts, selling ores, &c., and on all some profit is made. I conclude, therefore, that the payment in shares affords no protection whatever against the consequences of a bad bargain. What, then, is the right principle of payment? It seems to me that in equity the mode of payment should be determined by the character of the thing purchased. All matters and things having present value, such as land, houses, works, machinery, and ore actually in sight, should be paid for in cash, whilst all matters having a prospective value should be paid for in shares. The relative proportion of cash and shares will thus vary in every case, but as a principle it seems to me desirable in all cases to restrict the transfer of vendors' shares until dividends have actually been paid upon those shares which represent subscribed cash. I am confident that a careful attention to these principles of purchase would prevent many of the unfortunate results attendant on American and other investments.

A TRAVELLER.

THE SCIENCE OF INVESTMENTS.

SIR,—Fifteen years' purchase of the Van Mine is equal to about the market value; hence the investor receives 7 per cent. interest, while a recent proof of the continuance of ores in depth for only 10 fms. certain has added to the reserves the full amount of the entire products for the last four years. The mine, therefore, must be increased in prospective value fully 125,000*l*., and with advancing prices of lead and blende we doubt not but greatly increased dividends will rapidly follow. It must be borne in mind that the Van Mine is different from a joint-stock bank. The former has added to its positive coffers 250,000*l*. in reserve; the bank squares its balance-sheet yearly, and commences *de novo*. It depends on commerce, the honesty of employees, and the various fluctuations of trade. The future is uncertain from day to day, with peculiar liability to risks and panics. The Van is otherwise. The lodes are charged with minerals, the vast reserves exist, whilst the future for many years to come is protected. The depreciation in value of the London and Westminster Bank shares from 70½ to 64½ since 1872 is equal to 600,000*l*., equivalent to three half-yearly dividends on the paid-up capital; the London and County, from 65 to 55½, is a fall of 475,000*l*., or (say) 47½ per cent. of the entire paid-up capital. The London Joint-Stock, in the face of an increased dividend of 12½ per cent. from 10 per cent. last half-year, receded from 49 to 45½, 15*l*. called up (say), 280,000*l*. off the market value, or 25·33 per cent.; and the Union of London fell from 47½ to 42, equal to 440,000*l*. on a paid-up and interest-bearing capital of 1,200,000*l*. It is true that the shares sell at a premium of 27, which reduced the interest to investors to 7 per cent., as original subscribers only receive the 20 per cent. Thus a capitalist who purchased last year at 47½ would have received two dividends of 30*s*. each, and have lost 5*l*. 10*s*. of his capital on each share.

The discovery and announcement of the large deposits of lead and blende ores at Van took the mining public wholly by surprise at about the close of 1868. For the six months, June, 1869, the dividend was 3000*l*., which was trebled during the latter half. In 1870 the half-yearly dividends were 12,000*l*. to 18,000*l*., and for the year 1871 18,000*l*. respectively, while for last year the half-yearly dividends were 21,000*l*. and 21,750*l*., giving a total of 120,750*l*. in four years: 17,850 tons of lead ore have been sold at an average of 13*l*. 7*s*. 3½*d*. a ton, say 25*s*. a ton less than the average price obtained for the ores raised in the latter half of 1872, and to which must be added 4160 tons of blende at an average price of 3*l*. 7*s*. a ton. These two products yielded 252,519*l*. in gross, and afforded the shareholders in actual dividends no less a return than 47 4-5ths per cent. The Minera Mine, the wonder of the age until the discovery of the Van, compares less favourably in respect to profits from yield than the latter. The returns of the Minera from 1852 to the close of 1868, a period of 16 to 17 years, and the brightest of its history, were 1,067,543*l*., from which dividends of 456,541*l*. were declared, equal to 44 per cent. on the products of lead and blende. The paid-up capital of this company is 45,000*l*., against 63,750*l*. for the Van, but the latter includes the purchase money as well as the working expenses in developing the underground workings and the erection of an extensive and very efficient field of pumping, drawing, and dressing machinery. The cutting of the lode at the 60 has added 250,000*l*. to the reserves, a sum not only startling in magnitude, but almost equal to the entire products of the past four years.

It is by no means a difficult task to invest profitably and safely to the earnest and searching pupil of "science," even if he belongs to the humblest classes, providing he only uses a moderate degree of industry, discretion, and common sense. The path is easy to those possessed of superfluous wealth—the rich heiress, or the millionarie widow; the hereditary acres of the peer of long descent, and the accumulated wealth of the fortunate soldier, lawyer, or merchant, make the path smooth for the possessors, even if only possessed of ordinary intellect, and a modicum of prudence. Still there remains to be considered the vast hordes of smaller investors, who win their way to moderate competence through earnest thought, care, contrivance, abnegation, and indomitable application and perseverance, and who in bulk and power constitute the marrow of society, and the strength and influence of the commonwealth. It is not a "prospectus" with a sprinkling of peers, or a "report" with a preface of M.P.'s, that should command, as if by magic, our unanimous confidence, and lure the proceeds of toil from the breeches pockets of the saving and industrious. The investor should look to the future wholly irrespective of the past, and should thoroughly scrutinise and understand the present before he parts with his money. If he is ignorant of the "Science of Investments" pray let him consult some acknowledged authority, and act with ordinary discretion and intelligence, and then he will find, if he be not duly cognizant before, that there is often a security in a stock or share hopelessly depreciated, to all appearance, that even Consols do not possess, inasmuch as the market value has fallen to that point at which depreciation can go no farther, and is peculiarly exemplified in British mining, which pays better, and offer chances of brilliant success far beyond any other branch of our home industries.

For example, Tresavean was abandoned, and the greatest difficulty was experienced in getting a few hundreds subscribed to rework the mine, yet the results gave close on 500,000*l*. on 3200*l*. capital. Carn Brea, West Basset, Buller, East Pool, Tincroft, Great Vor, and many others of brilliant success were the rewards of perseverance, intellectual enterprise, and discreet selection. Again, East Caradon is an example of a Phœnix rising out of its own ashes; and now, again, we have the Van Consols starting into existence like a meteor of first effulgence. This property I called special attention to in January last in your valuable columns, and it is with more than ordinary pleasure that I congratulate the proprietary upon having a mine likely to equal, or, at all events, only to prove second, in importance and worth to the leviathan—the Van—itself. In my Review of Mining for the year 1872, published in your valuable Journal of Jan. 11, I observed—

"Mr. Greene has in Wales another prize in Van Consols and adjoining the Van, and herein again he shows his insight of the true principle of successful enterprise—paid up and ample capital; the results are cheap materials and machinery and active operations underground, culminating in 30,000*l*. reserves of ores unwrought. This mine is likely to first enter the Dividend List of all the competitors surrounding the great 'leviathan.'"

We sincerely anticipate recording the development of masses of ore at Van Consols at an early date, so as to establish the property as being one of those brilliant prizes in mining that startle while they fascinate the enterprising world.

Miscellaneous Securities, at the close of February last, presented the following features:—Anglo-American Mint, 6*l*. to 8*l*. prem., yielding investors 9½ interest; Fairburn Engineering Company par, paying 10 per cent.—the fluctuations in price, 1872, ranged from ½ dis. to 1¾ prem.; Rymney Iron Company, 50*l*. paid and 15*l*. paid, sell respectively at 5 to 10 and 1½ to 2¾ dis., and consequently yield purchasers 11 per cent. interest—the fluctuations during 1872 were 13 dis. to 1 prem. and 5 dis. to par; Canada Company, 96 to 100 par, pays 5 per cent., and fell to 21 dis., 1872; Fore-street Warehouse closed, Feb. 28, at 4¾ prem., paying 18½ per cent. on 14*l*., ranging, 1872, from 3¾ dis. to 13 prem.; Hudson's Bay fluctuated, 1872, from 7½ dis. to 1½ prem., 17*l*. paid, closing, Feb. 28, at 14½ to 15½; London General Omnibus stock, 110 to 115, ranged, 1872, so low as 27 dis.; Native Guano, 1½ to 1 prem., 5*l*. paid, ranged, 1872, as high as 21 prem.; Nant-y-Glo fluctuated from 83 to 103, and closed, Feb. 28, at 86 to 89 per 100*l*. share; Val de Travers, 7½, fluctuated, 1872, up to 19½, 10*l*. paid; and Phosphate Sewerage, 10*l*. paid, close 5¾ to 5½ dis., last dividend 20 per cent., and the range, 1872, was 5 dis. to 50 prem. As regards the above selection of miscellaneous investments, they present a wide field and scope not only for profitable absorption of surplus floating capital, but also for speculative dealings upon the Stock Exchange. It is at all times far more easy to detect those undertakings that will not prove worthy the attention of the permanent investor than it is to point out with unerring certainty those which do stand upon sound basis, and which will continue to pay remunerative interest over a series of years, and especially so if we attempt to combine prospective growth and expanding worth with freedom of risks. The latter are ever associated with the trading and commercial interests of this speculative age, with increasing enterprise and spirit of rivalry so deeply engrafted into our manufacturing and factory systems of conducting business. Still, the substantial dividends and wide fluctuations in market value of the stocks and shares referred to present a basis for operation not only to the most earnest and cautious investor, but likewise to the most vigilant, attentive, and spirited dealer for "time or money" on the Stock Exchange.

The iron trade is likely to be materially influenced and interfered with by the protracted ruling prices of coals. It is not improbable we may lose a very considerable portion of our export trade, and yet find the material results more advantageous and more economical through importing various forms of crude and manufactured iron from countries where it will, in all likelihood, be produced in superabundance for their own requirements at home, and at a far cheaper cost than it can be raised in England. It is computed, by an acknowledged authority, that fully 15,000,000 tons of coal are consumed annually in the manufacture of pig-iron, and an equal quantity in the conversion of iron, so that 30,000,000 tons of coal are consumed, in the class of articles of which we export to foreign nations, 10,000,000*l*. worth, while only 3,000,000 tons of coal are required for the manufacture of textile fabrics, of which we export over 100,000,000*l*. sterling annually. This exhibits in a most striking manner how little our coal supply may have to do with the material growth and volume of our manufactured export trade otherwise than in iron; the latter requiring tenfold the quantity to secure an export of 10,000,000*l*. that is consumed in a trade of 100,000,000*l*. of texible fabrics. England is supposed to export about 12,000,000 tons of coal annually. This withdrawal of the natural and material wealth and creative power of the Mother Country should at once be stopped, or such a duty imposed as will produce a revenue equal to one-half the interest accruing on our National Debt. Welsh bars are quoted 13*l*. to 13*l*. 10*s*.; Staffordshire bars, 15*l*. to 16*l*.; sheets, 20*l*. to 21*l*.; pig-iron in Wales, 6*l*. 10*s*. to 7*l*. 10*s*.; railway bars, 12*l*. 10*s*. to 13*l*.; Clyde pigs, 7*l*. 5*s*. to 7*l*. 15*s*.; railway spikes, 12*l*. 10*s*. to 14*l*. a ton; while Swedish bars in London stand at 18*l*. per ton.

Should our productions of pig-iron this year reach 6,000,000 tons, and valued at the low computation of 6*l*. per ton, we have a revenue of 36,000,000*l*. against 16,667,947*l*. for the year 1871 (published July last); and should the coal product amount to 100,000,000 tons instead of 125,000,000 tons (the computed yield but for strikes and lock-outs) the value at 20*s*. a ton only will give 100,000,000*l*. sterling against 35,205,608*l*.—the money value of 117,352,028 tons raised at the pit's mouth in 1871. After these figures, who will dare to question the importance and value of mining products and industries in the material wealth, social comfort and employment, and political influence of England and its vast population?

32, Fleet-street, March 10. RICHARD TREDINNICK,
Consulting Mining Engineer.

LEGITIMATE MINING—No. III.

SIR,—In this letter it is my intention to bring to the notice of your readers another legitimate mine situate in this district—the BEDFORD UNITED,—near Tavistock, Devon.

This mine is conducted on the Cost-book Principle, in 12,000 shares, a large proportion of which are held in the district. It is well provided with machinery, having two powerful water wheels for pumping, with an ample stream of water all the year round, also a 22 in. rotary engine for drawing and crushing the copper ores. Up to the year 1854 this mine on an outlay of 9333*l*. 6*s*. 8*d*. returned to the shareholders 54,000*l*. in dividends from the Marquis lode, but the bottom levels becoming unproductive the attention of the adventurers was turned to one of the parallel lodes, which since that date has been continuously explored by a shaft sunk 115 fms. deep, and by levels driven east and west, at various depths of 47, 65, 75, 90, 103, and 115 fms., leading to some good discoveries of copper ores, and from which the monthly returns are now 110 tons, with every prospect, judging from the quantity of ore ground now laid open, of larger samplings being made for the future sufficient to meet all costs, and enable the mine to be further developed without calling on the pockets of the shareholders.

To attain this position has necessitated heavy calls, but there appears now every probability that the perseverance and patience of the adventurers will be well rewarded. I may add that the Delves Kitchen, or No. 1 south lode, is showing excellent indications for copper ore now being laid open by the adit level. This lode and No. 2 south lode, on which nothing as yet has been done, are standing entire for the length of the sett, which is 1¼ mile from east to west.

25, Cheltenham-place, Plymouth, March 12. EDWARD BETTELEY.

P.S.—It would be of great assistance to investors and others in estimating the value of any property if agents would more frequently state in their reports the prices paid for driving and stoping, and the value of the ore, as it would show the nature of the ground being wrought.

GREENSIDE LEAD MINE, CUMBERLAND.

SIR,—In a paragraph in a recent number of the *Mining Journal* I see it reported that "at Greenside Mine a third level has recently been driven below the other levels, but unfortunately a large portion of that vein is occupied with barren rock." This is not correct, and may lead to a wrong opinion being formed as to the value of this very important mine. I presume the level alluded to is the low level, that was commenced in 1853, and was regularly worked by six men till the east side of Greenside vein was cut, in 1868. This portion of the vein was cut very rich, 2 ft. in width, being composed of nearly solid galena, estimated at 7 tons of lead ore per fathom, and worth 100*l*. per fathom. This important discovery trebled the value of the mine. The west part or check of the vein has not yet been cut, but in all probability will turn out richer than the east branch, as has been the case in the vein above. This level is 40 fms. below the lowest sinking from the levels above, consequently an immense field of riches is opened out for a great number of years to come. Your correspondent is evidently misinformed, as he also states that in 1872, owing to the peculiar cutting off of the veinstuff, the produce of ore has not been kept up. This is not the case. The falling short in the produce of 1872 is owing entirely to an insufficient number of hands being employed. There is a supply of bouse ready worked down and lying in the mine, valued at 120,000*l*., in addition to the valuable mine as it now stands opened out. SHAREHOLDER.

WHEAL KITTY (ST. AGNES).

SIR,—It appears to me that this mine, which I cannot but think is one of the soundest and most promising mines of the present day, receives far less than its due share of attention from the investing public. I venture, therefore, to call the attention of those who are in search of a safe and very profitable investment to the present condition and prospects of this property.

Wheal Kitty is under the able management of Captain Teague—a guarantee in itself that the working is conducted in the most prudent and skilful manner. For several years past its value has been steadily progressing, and dividends are paid with the regularity of Consols. From May, 1869, to February, 1870, the dividends were 5*s*. quarterly; in May 6*s*. was paid; in August and November the dividends were 7*s*., which was increased in February and May, 1871, to 7*s*. 6*d*. In August, 1871, the dividend was 10*s*., and that amount has been paid regularly every quarter since. As to the future, there seems every probability of steady increase. At the last meeting, in February, the usual dividend of 10*s*. was paid, notwithstanding the payment of the 13th month's costs, and the payment of a month's bills, which would ordinarily and might well have been brought into the present quarter's accounts next May. The quarterly sales of tin since the commencement of last year have been as follows:—February account, 1872, 50 tons 17 cwts.; May, 49 tons 12 cwts.; August, 53 tons 11 cwts.; November, 60 tons 18 cwts.; and February, 1873, 60 tons 9 cwts.; thus showing a steady increase up to 10 tons quarterly for the year. During the same period considerable progress has been made in the development of the mine. In the last May report the cutting of the lode in the 130 was announced, and it was added—"We consider the cutting of this lode so productive that it has added much to the value and permanency of the mine." The lode was then valued at 12*l*. per fathom, and it has continued about that value since; one end, however, at one time being valued as highly as 16*l*. Since the cutting of this level the shaft has been sunk continuously below the 130, and is down to within 3 fms. of the next, or 142 fm. level, which is expected to be reached in about three months; but in the sinking of this shaft the lode was again a few weeks since unexpectedly met with, and it was valued at the point where it was then cut at 14*l*., which value is still maintained (see last week's report). This again must add considerably to the value and stability of the mine, as it not only adds to the present productiveness of the mine, but shows that the lode fully maintains its value as the depth is increased. Under all these circumstances I think I am warranted in calling the attention of those who want a steady and profitable investment to this mine, for even should the quarterly dividends not yet be increased, there can be but little doubt they will be maintained at the present rate. Should coals and other materials become cheaper, or should the price of tin rise, all which are very probable, there can be no doubt a considerable difference will soon be apparent in the profits. Notwithstanding all the circumstances I have mentioned, the shares may be picked up at 15½*l*., so as to pay 13 per cent. They would be cheap, in my opinion, at 20*l*., for they would then pay 10 per cent.—a higher rate than is paid by many other mines for which there is greater demand, and there is no great probability of the dividends soon being increased.

Having, as you will see, considerable acquaintance with the condition and prospects of this mine, I have troubled you with this letter, as I doubt not there are many of your readers who are glad to hear of really sound mines for investment.

March 10. ONE WHO KNOWS.

THE RED RIVER.

SIR,—I perceive that Mr. Ennor has concluded his series of letters on this subject, and I hope that the mine agents interested are sufficiently grateful for his gratuitous services on their behalf. They know now *quite as much* as they did before.—*Truro, March* 13. R. SYMONS.

EAST TERRAS MINE.

SIR,—This mine, which is situate eastward of and contiguous to the Terras Mine, was brought before the public in December, 1870, in 25,000 shares of 1*l*. each. In Terras, in the same number of shares, was at that time selling at the rate of 25,000*l*. for that property, it was thought that this mine would be taken up readily; but I find that only about 2000 shares were subscribed for, and that only about 200*l*. has been expended in labour cost out of the amount paid in.

There was a respectable board of directors appointed, but it appears they decline to act. As one of the lessees and shareholder, I have been pressing the secretary to call a meeting of the company, but his inability to get the directors to meet is alleged as a reason for his non-compliance with my request and that of the late manager. There is a rent of 50*l*. per annum still current; it is, therefore, desirable that a decision should be arrived at to the disposition or utilisation of the property as early as possible. I, therefore, beg that the directors—in justice to the shareholders—will be good enough to meet, and arrange for an early meeting of the company.—*Truro, March* 13. R. SYMONS.

WHEAL EMILY HENRIETTA.

SIR,—I see a special meeting of the shareholders of this mine is to be held, to take into consideration the future working or otherwise. Now I cannot help thinking it would be a very great pity to abandon the mine after the great costs we have incurred in partly developing the resources of this valuable sett. We are situate in one of the best districts in Cornwall, and I, for one, should much like to see our north ground worked, and not allow others to come in and reap the benefit of the heavy calls we have responded to. We have a good purser in Mr. Penrose, and should some of the present shareholders retire from the company I do not think he would have any difficulty in getting fresh blood in the concern. I shall not be able to attend the meeting, and, therefore, throw out this hint to my brother shareholders. A SHAREHOLDER.

THE TERRAS MINE, AND ITS MANAGEMENT.

SIR,—We noticed some time since a correspondence in your Journal between the managers of Terras, in this district, and Messrs. Marlborough and Co., and being somewhat acquainted with the mine and its prospects, we were satisfied with the correctness of Messrs. Marlborough and Co.'s opinion, that no profits could be obtained to justify a dividend on their then scale of working—*viz.*, a low class elvan, with steam machinery. Upon the correctness of their observations on the management we had no means of forming an opinion; they appear, however, from the result to have been well founded, it having been found necessary to change the management and raise fresh capital. The shareholders should not on that account be downhearted, as we are of opinion that a judicious expenditure on the lodes in that district (instead of the elvan) will place the mine in a profitable position. We know now of some other mines where the chances of success are only marred by the incompetency of the executive. It requires not only a good sett but ample capital and a judicious expenditure to ensure success in mining.

St. Austell, March 12. MAUDSLAY AND CO.

THE EMMA MINE.

SIR,—As many of your readers are shareholders in the Emma Mine, I trust these remarks will be considered worth insertion. As no notice has been taken of some facts which should, as I conceive, been commented on last Thursday at the meeting, therefore I presume so noticed entirely, I write the following:—

1.—Twelve months since Mr. Park said that had he known the value of the mine he would not have sold it for one million of money. It appears that since that time Mr. Park has been quietly reducing his interest in the mine from 25,250 shares to 25 shares, the number that ex-director now holds; in other words, he has sold 25,175 shares, which (say) at an average of 20*l*. each, is 503,500*l*. In my estimation Mr. Park has done well as far as selling his shares.

2.—Many months since Mr. Park told us he could do much better for us if he were permitted to sell in America a certain class of ores. This the directors sanctioned. Since then Mr. Park has been selling ores in America, and remitting cash of money here—he now says he has remitted 33,000*l*. too much. Now, I will have doubts as to Mr. Park having lost money by buying our ore, and I do think before we pay this 33,000*l*. we ought to make sure—1, that Mr. Park has not had better class of ore out of the mine than he has been paying for; 2, that we should make sure that this 33,000*l*. does not belong to us—a matter which Mr. Park has forgotten to show how he has remitted more correctly than he has yet shown. Question—Will this account for the falling off in the quality of the ore?

3.—It is an admitted fact that our late agent, Mr. Hussey, informed Messrs. Johnson and others more correctly than he did us.

4.—We were first told that the Illinois Tunnel was of no use to us, and now we are made to buy it.

The two last paragraphs suggest the following questions:—

1.—Was not the Illinois Tunnel and the peculiar wording of our grant or sett part of an organised scheme from the beginning?

2.—Are not the proprietors of the Illinois Tunnel, Messrs. Johnson, Park, and Hussey, all partners, instead of being, as we conceived, two separate companies?

A SHAREHOLDER.

P.S.—Since writing the above I have read in a Glasgow paper some remarks of another shareholder, who signs himself "D." "D." points out how extraordinary it is that the directors did not find out how deeply we were in debt until Mr. Park had sold his shares. "D." also, in speaking of the accounts, observes that apparently 1568 tons of ore are missing and unaccounted for, and also shows that 70,230*l*. of money are unaccounted for. Now, if this be so, it may after all be found that Mr. Park, instead of remitting us too much, is still in our debt, so that it may turn out to be a fact that instead of our owing Mr. Park the 33,848*l*. 19*s*. set forth, he owes us quite 36,381*l*.—thus 70,230*l*., less 33,848*l*. 19*s*. 11*d*., leaves 36,381*l*. 5*s*.

THE EMMA MEETING.

SIR,—I thank you for your insertion of my letter in the Journal of last Saturday week. Mr. Orr Ewing, I see, abandons the defence of the American as hopeless, but vindicates the honour of the English directors. But to do so he adopts my second alternative, and allows that they were not "sharp" enough, in the American sense of the word, and were completely over reached by their acute brethren. On that ground he pleads for our indulgence towards them, and our better view of our own future prospects. I see the force of his plea for charity, but fail to discern much foundation for hope. It requiries great exercise of faith to indulge in it.

I wish, however to call attention to that strange item in the accounts of 33,848*l*., said to be "due" to Mr. Park. This, though referred to at the meeting, seems to have been suffered to pass without sufficient notice. Can the directors be required to refund it to that gentleman on any fair grounds of honour? How came they ever to have incurred such an obligation? He must have advanced it on the false pretence of its being money earned by the mine. Can we suppose he did not know it to be false? That falsehood enabled him to dispose of his shares at a premium for more than 500,000*l*. Are the directors then to take money which rightly belongs to the poor deluded victims, and hand it over to swell the gains of their voracious spoiler? Let the matter be fairly sifted, and impartially decided.

I thank Mr. Orr Ewing for defending the "honesty" of our English directors, even at the cost of their common sense; for, as I would rather be the deceived than the deceiver, he leaves me some little ground still for being proud (or at the least not ashamed) of my nationality. AN ENGLISHMAN.

Liverpool, March 12.

THE BENSBERG MINING COMPANY.

SIR,—Being absent from home at the time of the meeting of this company I did not attend, otherwise I should have asked the directors what their object is in engaging a resident engineer to superintend the purchase and erection of machinery. It sounds so very strange to hear them say in one breath that they have engaged a sub-manager who is thoroughly conversant with all the machinery required on the mine, and immediately after announcing that they thought it desirable to appoint a resident engineer. Now, how on earth can a man in Liverpool decide what machinery is best suited to Bensberg, and particularly one who probably never yet saw the mine? If the sub-manager has had so much experience as the directors assert, surely he can advise what machinery is best suited to the ores. Then, again, from the reports which appear in the Journal I understood that the machinery is being made in Germany, and not in Liverpool, and is already mostly delivered. I think this demands some explanation, as we are yet hardly in a position to find sinecures for our friends or relations.

SHAREHOLDER.

AMERICAN MINING COMPANIES—FLAGSTAFF VENDORS' SHARES.

SIR,—Appended to a comment of your own upon the Flagstaff Company, I see an answer to my previous enquiry upon the vendors' shares. Their present holding it seems is now one of 3500. During the past year, therefore, these parties must have sold out the difference of the 20,000 originally held by them—16,500 shares. Whether want of money or want of confidence in the mine has led to this important change in their interest in the property must, of course, be left to conjecture. Only 10,000 shares were at first offered to the public, yet now nearly the entire capital is in its hands. The vendors received the balance of purchase money, 100,000*l*., in shares in the sudden way they have done—rushing wholesale, as it were, out of an investment paying dividends of 30 per cent. But why did the venders of the Emma, of the Camp Floyd, of the Saturn, of the South Aurora sell their shares with like precipitation? The condition of each of these properties furnishes a reply, and affords a warning as to what a similar sign may forbode when exhibited by another company.

I doubt whether the law would not justify all directors of American mining companies in refusing transfers of venders' shares, even when nothing is said upon the subject in the articles, until the expectations held out have in every respect been

...lief. An act of prudence of this kind as against foreigners of no position here, ...from whom redress would otherwise be almost impossible, would, I believe, be ...eld by our Courts, and stop these rats running away from the ship they have ...ped to founder, as hitherto they have done.

...Your correspondent, "Veritas," will see by sect. 25 of the Companies Act, 1862, ...he is entitled to find at the Flagstaff, in one or more books, a detailed list of the ...holders, with their respective share-holdings in the company set forth, and the ...es specified by their distinctive numbers; and that any company failing in pro... ...ing this information incurs a penalty of 5*l.* a-day by such default. His drawing ...the attention of the company to this might lead to a useful change in the official re... ...s, and render their testimony much more valuable to him in the future, in ...

CAUTION.

...t of clearness.

[For remainder of Original Correspondence see to-day's Journal.]

Royal School of Mines, Jermyn Street.

GEOLOGY—LECTURE V.

..."A Course of Lectures on "Lakes, their Origin, and Geographical and Geolo... ...cal Distribution" is being delivered on Monday evenings at the Geological ...Museum by Prof. RAMSAY, F.R.S., Director General of the Geological Survey ...of the United Kingdom.

In his fifth lecture, Prof. RAMSAY, F.R.S., dealt with the "Salt ...Lakes of the New Red Sandstone, and Marl Epochs." He said—In ...my last lecture I began with a brief description of the carboniferous ...strata, and passed on to consider my chief subject—the Permian ...strata, consisting in the main of two great divisions, the lower being ...formed of red marls, sandstones, and conglomerates, and the upper ...of magnesian limestone; and from various considerations I feel justi... ...in concluding that these strata were formed, not in the open sea, but in a great ...inland lake, or set of lakes, comparable with the Caspean Sea of the present day. ...You must now suppose that these strata, through time and pressure and chemical ...changes going on within them from percolation of water through the strata, by ...which they got consolidated into rock, and that this being the case, disturbances took ...place in the crust of the earth where these strata had been formed, and not only ...these, but in all the old strata that surrounded them, they were distorted and heaved ...up, and were exposed to waste by the action of the atmosphere, and the action of ...the sea and rivers, and the next set of strata were deposited upon these, called in ...English geology the New Red Sandstone and Marl, but on the Continent the Trias. ...In all these latter strata lie quite unconformably upon the Permian beds—*i.e.*, you ...do not find the Permian strata lying in an inclined position, and the New Red Sand... ...stone deposited more or less horizontally upon their edges, proving that the former ...had been disturbed and denuded before the deposition of the latter. And this shows ...that there was a considerable lapse of time between the completion of the Permian ...and the beginning of the deposition of the New Red Sandstone. ...Trias (in our area), and the beginning of that large geological division called by geologists Palæozoic ...(the former belong to that large geological division called by geologists Palæozoic ...(meaning "ancient life"), and the latter to the Mesozoic (or "middle life"). ...The Trias consists of several divisions; the lower part is several hundred feet of ...red sandstone; above that several hundred feet of coarse red conglomerates; then ...more red sandstones; and then you pass out of the "New Red Sand... ...stone that more red sandstones; and then you pass out of the "New Red Sand... ...stone" into the "New Red Marl," and that is usually called on the Continent the ..."Keuper" (a German term, though I have never met with a German who could ...define the meaning of it, but I believe it was a local miners' term), which consists ...mainly of beds of red marl; at the base of them there are white sandstones, occa... ...sionally red, intermingled with beds of red marl; in the middle there are more ...frequently red, intermingled with beds of red marls, and it is in these last that the beds of rock salt ...and gypsum are found. The sandstones and red marls, and it is in these last that the beds of rock salt ...and gypsum are found. These sandstones are more or less conformable to each other, and clearly constitute one ...great series. All are more or less conformable to each other, and clearly constitute one ...great series. In the New Red Sandstones of England I am not aware that a single ...fossil has ever been found, though the total thickness is, perhaps, from 500 ft. to ...2000 ft., although many quarries are open in it, and they have been searched again ...and again. Its position in the country is this—Beginning in Cheshire and Lanca... ...shire, it occupies the great part of the middle of England, and everywhere in the ...south it is overlaid by the New Red Marl; it runs north-east to Scotland, but in the ...Midland portions of that country no traces of it are known. Although no fossils ...have been found to show us anything regarding its origin, nevertheless there is ...the red colour of the rocks, and that, as I have explained before, always seems to ...indicate a probability that they were formed in inland waters. On the continent ...of Europe, here and there in Germany and elsewhere, fossils have been found; there ...are a great number of ferns (true land plants); plants allied to Cycadæa, fragments ...of a considerable number of coniferous trees (of which class the yew and pine are ...examples); then calamites, of the same genera but of different species to those ...found in the coal measures, and along with these, though very sparingly, three or ...four species of marine shells, and these may have been a miserable relic of a truly ...marine fauna, which managed to live in in the salt water lakes in which these strata ...were being deposited. Whether the New Red Sandstone of Britain was deposited ...in salt waters or fresh I am unable to say.

Now we come to the New Red Marl, which affords a much more marked kind ...of evidence than that given by the New Red Sandstone. In Lancashire and Che... ...shire these beds form a great patch, about 40 miles long, and of very great width. ...For the most part they are red, but occasionally there are grey or greenish patches ...or streaks, and intermingled with them are sometimes white sandstones, occasionally ...red or greyish. In Cheshire these strata are probably not less than 2000 ft., or ...perhaps even 2500 ft., thick; they run through all this central part of England, ...and go down along the valley of the Severn to the neighbourhood of Bristol, and form ...a considerable amount of the strata in West Somersetshire and parts of Devonshire; ...then they pass up to the Tees, and strike out to sea. It is in these strata, and these ...alone, that beds of rock salt occur in Britain; they occur in Cheshire in masses of ...considerable thickness, and in an area perhaps 40 miles in diameter. A section ...would give something of this kind—at the bottom a quantity of red marl; then a ...bed of rock salt, 106 ft. thick; then more marls, 30 ft.; then another bed of salt, ...50 ft. thick; and above that more marls, 127 ft. thick, so that we get two great ...masses of rock salt, interstratified with beds of red marl: and the salt is frequently ...bright and clear, and beautifully pure (but even when illuminated with hundreds ...of candles, not so sparkling as popularly supposed), but not unfrequently it is ...stained with iron, has a red colour, and sometimes a great quantity of marly matter ...mixed through it. If you take a specimen of sea water and analyse it you will ...find that the salts in it consist (in an average specimen from the Atlantic) of about ...3 per cent. common salt; 8·5 chloride of magnesia; 4 sulphate of lime; and 6·5 ...of other ingredients. Now, in one specimen of rock salt the analysis showed—...common salt; 0·25 chloride of lime; 0·12 chloride of magnesia; 0·20 sulphate ...of lime; and a second specimen, 99·85 common salt; and 0·15 chloride of magnesia.

You will remember that I described to you how various kinds of salts, and very ...often nearly pure chloride of sodium (common salt), are being deposited in lakes ...in the present day, in lakes that have rivers running into them, but have no out... ...let, and only get rid of their surplus water by evaporation, and how in course of ...time the salts in solution in the water would become so concentrated as to be pre... ...cipitated to the bottom. In the great flats on the shores of these lakes, covered ...with 10 or 20 ft. of water when the water is dried up by evaporation in summer, ...comparatively thick cakes of white rock salt are formed on the flats. Let us apply ...these facts to the New Red Marl; here are beds of rock salt embedded in it, and ...these beds I conceive must have been deposited from solutions in inland lakes, ...because the sea is not so salt that any salt could be precipitated there, and not by ...any processes that we can suppose is it in the slightest degree likely in any period ...of the earth's history was the sea by the sun's heat so evaporated, or so nearly ...evaporated away, that rock salt could be deposited on its bottom. There are other ...reasons why we suppose that salt was formed in some way similar to that in the ...lakes of Central Asia and America. If we look at a map of Europe we shall see ...that the mountains of Scotland point straight away to the Scandinavian chain.

The New Red Sandstone lies in greater part to the east of the mountain regions ...of England, and it has been supposed by Prof. Rogers that these ranges were much ...higher than at present during the deposition of the New Red Marl, and we may ...well believe they were, considering the vast amount of waste they must since that ...time have suffered. The western winds were, it is presumed, the same then as ...now, and would have to cross those mountains to get to where the beds of Permian ...strata lie, and consequently there would be much precipitation on the western side ...of the mountains, while the rainfall on the eastern side would be comparatively ...small, and for a similar as that which obtains in Central Asia the lakes which ...have no outflow, and by-and-bye the salts in the waters would get concentrated by ...evaporation, and these wonderful beds of rock salt would be the result.

In the New Red Marl there are also quantities of gypsum, and for the same reason ...that I cannot conceive rock salt or magnesian limestone to have been deposited by ...precipitation in the sea, so neither can I conceive gypsum to have been deposited ...there, and it can only have been formed by its salts having been carried into these ...lakes of the New Red Marl, and there deposited in the manner I have described. ...I have consulted many chemists on the subject, and all agree with me that it is ex... ...tremely improbable, if not impossible, that these deposits could take place in the ...open sea, and therefore I am justified in saying that this is an additional proof ...that the New Red Marl was deposited in inland salt lakes. In the Keuper sand... ...stones are beds full of the stems of land plants, but of what kinds we cannot say, ...but in beds of the same age on the Continent are remains of coniferous trees, &c.; ...this shows the immediate proximity of land, from which I believe they were drifted ...into the lakes. A small bivalve crustacean—Estheria—about the size of a grain of ...barley, occurs in great numbers, and is frequently found at the present day in small ...pools as left by the sea, and it may also live in salt lakes, so that its presence is no ...proof to the contrary of what I have asserted as to the origin of strata in lakes. ...The remains of numerous reptiles occur in the Keuper sandstones, and sometimes ...in the New Red Marl, sufficient to show that they belonged to such creatures as ...are not in the habit of living in the open sea.

On the east coast of the North of Scotland lie certain strata, for a long time con... ...sidered Old Red Sandstone, but now believed to belong to the New Red Sandstone ...period, though I am not yet quite satisfied on the point; but it does not matter for ...my arguments to which period they belong, since I believe I can prove that they ...were formed in inland waters, as I have endeavoured to show rocks of both those ...periods were. The first species is Staganolepis, a true crocodile, the scutæ (or hard ...bony external covering as in modern crocodiles) of which have been found, and ...though crocodiles sometimes get down rivers into brackish water, we know their ...habitation is in rivers, and it may be lakes. Besides this there are certain reptilian ...structures classed under the great division of Dinesauria, and they are also found ...in the magnesian conglomerates of the Mendip Hills, and these creatures, as far ...as is known, were truly terrestrial; they have considerable affinities with birds, ...except legs in front and long legs behind, four toes on the one foot, and five on the ...other, and claws at the end of them, and their foot prints (in Permian rocks of ...Connecticut, United States) have actually been mistaken for those of birds, and ...described as such by Prof. Hitchcock. The creatures seem to have used their hind ...legs more than their front ones, and appear to have walked somewhat after the ...manner of the Kangaroo. A long groove, formed lengthwise between the foot prints, ...was supposed by Prof. Hitchcock to be the impression of a long fleshy tail which ...these ancient birds possessed, but which have now come to be regarded as formed ...by the tails of the Dinosaurian reptiles which made the footprints. The proof, on ...the whole, seems to be that these Dinosaurians were true land reptiles that walked ...on the shores of these old lakes when these shores were exposed, and the im... ...pressions they made on the soft mud were baked in the sun and hardened, and the ...water on returning threw down upon them new layers of sediment. A few fish ...have been found in these beds, but the fish do not decide whether the beds are salt ...or fresh or brackish water deposits.

In Somersetshire, on the south banks of the estuary of the Severn, in strata be... ...longing to the New Red Marl, in which sun cracks (another proof of inland waters ...in the main) occur, there has been found the remains of a true mammal—Micro... ...lestes antiquus—a very small marsupial or pouched animal, and approximately ...allied to the modern Kangaroo, and this is another proof of the neighbourhood of ...land. Thus I think I have shown you a number of converging proofs of the New ...Red Sandstone and Marl having been deposited in inland waters, and certainly not ...in the open sea; in no set of marine beds that I know is there such a set of con... ...verging proofs as this. The establishment of these views as to the lacustrine origin ...of many strata has effected a very remarkable change in the ideas and commonly ...accepted beliefs of geologists from the earliest days of geology to the present day. ...I can very well remember when all the formations used to be spoken of as sea for... ...mations, and that the only kind of history which had passed down from the old ...world was to be got from a consideration of these particular kinds of animals that ...lived in the sea. Here I have attempted to show proofs of a very long continental ...period indeed, which in point of duration is very much greater than many of the ...marine formations put together. The rudiments of the present continents of ...Europe, Asia, Africa, and North America began, then, in these old times; there ...were great continental areas in all of those positions at that period; they have been ...submerged since, and have emerged again, and here they are large continents still; ...and if I were asked to endeavour to form an opinion with regard to the great length ...of time between the close of the Upper Silurian period and the beginning of the ...Lias, I should say it possibly was one-third or one-fourth of the whole of geological ...time that we know anything about from the Cambrian epoch down to the present.

PRACTICAL METALLURGY.

The ability of Mr. MAKINS to deal with the subject of Metallurgy has been evidenced by the thoroughly useful and practical character of his Manual issued, and as the second edition,* just issued, is similar in character, though to a large extent re-written and much enlarged, it cannot fail to prove equally acceptable to a large number of readers. It will be recollected that the first edition was the substance of a short course of lectures delivered with regard to special requirements during the author's connection with the Bank of England, as one of its assayers and referee, but the circulation of the work went so far beyond the circle for which it was originally intended that it has wisely been determined to adapt the second edition more thoroughly to the wants of the general student, without, however, in any degree lessening its value to those more generally engaged in connection with the metallurgy of the precious metals.

In treating of the general properties of the metals, Mr. Makins remarks that the rapid progress made in metallurgy, both in the improvement of its older operations, as well as in the devising and carrying out of new ones, is mainly due to chemistry. During the present century, commencing with Davy's isolation of the metals of the alkalies and alkaline earths in 1808, discoveries have rapidly progressed, so that what were chemical rarities—as aluminium and magnesium, for instance—are now in daily manufacture on a large scale. The progress of chemical knowledge has led to more complete examination of these subjects. Thus, in the case of magnesium, which Davy failed to isolate, a later chemist, Bussy, succeeded in, and Sonstadt has of late rendered its production an ordinary operation. Of the known metals not more than about 14 are employed in their true metallic condition; 12 are extensively used in their compounds, and some of these for alloying purposes, while the 24 remaining are more or less rare. The metals are not only placed in separate divisions, but those of the same division are distinguished into useful and little used, by a difference in the size of the type in which they are printed. The chapter on the combinations of metals with the non-metallic elements is very lucid, and in the succeeding chapter, on metallic salts and alloys, the mode of crystallisation, and the manner in which the several crystals belonging to the same system may be produced from the primary form, are very carefully explained. There is, then, a chapter on heating apparatus, furnaces, &c., and another on the fuels applicable to metallurgic operations; whilst the remaining chapters are devoted to the consideration of the several metals in their order.

The work throughout is written in a style which will be appreciated by all practical men, since the information given is very complete, and the language in which it is given concise and to the point. The illustrations are numerous and admirably executed, and render the descriptions easily intelligible; while the fact that Mr. Makins has availed himself of the researches of the principal continental metallurgists, as well as his own and of others in this country, makes the book in every way reliable as a text-book for students on the subject.

* "A Manual of Metallurgy." By GEO. HOGARTH MAKINS, M.R.C.S., F.C.S. London: Ellis and White, New Bond-street.

AMERICAN RAILWAYS AS INVESTMENTS.—An interesting pamphlet, forming one of "Cracroft's Investment Tracts," has just been issued (through Mr. Stanford, of Charing-cross), in which the desirability of American railways as investments is carefully discussed by reference to the average profits earned, the conditions and distribution of profit, the land grants, and the legal position of American railways. Mr. Cracroft explains that the authorship of the work is entirely due to Mr. Robert Giffen, and that his share in the work consists in the suggestion of the enquiry and in the collection of the materials. The assistance derived from Poor's Railway Manual is also acknowledged. A summary of the most important facts is given, which shows that for a mileage of 48,022 the total capital raised amounts to 518,642,000*l.*, or 10,800*l.* per mile, represented by 275,644,000*l.* stock; 224,142,000*l.*, and 17,268,000*l.* floating debt. The cost of road equipment, &c., has been 433,247,000*l.*, or 9000*l.* per mile, and the gross earnings are 76,591,000*l.*, or 1595*l.* per mile; the proportion of passenger earnings to total earnings is 29 per cent.; the working expenses, taxes, rents, &c., amount to 49,931,000*l.*, or 1040*l.* per mile, and the proportion of expenses to gross earnings 65 per cent.; the net earnings were 26,660,000*l.*, or 555*l.* per mile; the proportion of net to gross earnings being 35 per cent. The percentage of net earnings was—on capital, 5*l.* 2*s.* 11*d*; on cost of road, equipment, &c., 6*l.* 3*s.* 1*d.* per cent.; and on funded and floating debt, 1*l.* 0*s.* 10*d.* per cent. The entire subject is ably treated, and the tract will be found well worthy of the careful perusal of all who are seeking investments.

ECLECTIC ENGINEERING MAGAZINE.—The large number of technical journals devoted to engineering and subjects connected with it render it almost impossible for the man of business to give them all sufficient attention to enable him to keep himself acquainted with the facts which have been ascertained by experience, and which he might frequently turn to his own advantage; but as it is by no means difficult to condense and summarise much of the technical and scientific literature published in such a manner that the gist of the arguments put forward may be ascertained in a very brief period, and that almost as much benefit can be derived from the abstract as from the original. The knowledge of this fact led to the commencement a few years since of VAN NOSTRAND'S ELECTRIC ENGINEERING MAGAZINE, which, in addition to reliable abstracts of the chief contributions to engineering literature by American engineers, furnishes reprints and translations of many of the most valuable papers and articles published in the engineering and scientific journals of England, France, and Germany. These selections appear to be in all cases made with the utmost skill and judgment, and with every consideration for the requirements of the profession for which it is intended. In America the work must be invaluable, and even in this country, although our facilities for obtaining the French and German originals are perhaps greater, the magazine would prove exceedingly useful and interesting to a very large number of persons connected with engineering matters.

STEAM IN THE ENGINE: ITS HEAT AND ITS WORK.—In a thoughtfully written memoir (just published by Messrs. Blackie and Son, of Paternoster-buildings) Mr. P. KAUFFER, managing engineer, of Leeds, fully discusses the question how far the theories laid down with respect to the work done by steam coincide with the results observed in practical experience. That his work will prove of utility to scientific men, engineers, and the general industrial public is beyond doubt, and few will question the value of his observation that the enormous rise in wages more and more obliges the steam user, even in the coal districts, not to spare his money too much in the first outlay when buying an engine and boiler, but to look for the best engine, the one most adapted for his kind of work, and the one which, consequently, performs its duty with the smallest amount of fuel. It appears that Joule's number—772 ft.-lbs.—is practically correct, though it may not be absolutely so. Mr. Kauffer also offers some useful remarks on the reading of diagrams, attention to which will prevent much misconception as to how an engine is working. The memoir is worthy of extensive circulation among practical men.

THE MANUFACTURERS' DIRECTORY.—The third edition of the Illustrated Guide and Directory of Manufacturers of Great Britain and Ireland* has just been issued, thoroughly revised and greatly enlarged and improved in form. The Directory, which as its name indicates, embraces the entire kingdom, contains three indices, each of which will prove of much value to men of business. The alphabetical index to the various trades has been largely extended, though it is still retained as an inflexible principle that none but *bona fide* manufacturers shall be inserted. The object of this index is to render the buyer independent of agents of any kind by bringing him face to face, not with the merchant who supplies, but with the manufacturer who makes the article he wants, and there can be no doubt that when the purchaser is prepared to buy in large quantities, and for ready money, this direct method of dealing would be perfectly practicable. The directory of towns is a very large one, and as they are arranged alphabetically, without regard to country, &c., any particular town can be instantly referred to. Illustrated descriptive articles are appended to the index, with a view to afford coreect information respecting the productions, patents, and improvements introduced by the leading manufacturers. In many instances the descriptions have been furnished by the inventors and manufacturers themselves, and in all cases they have been carefully verified by the personal inspection of the compiler. Each firm noticed has either been personally visited, or its papers have been submitted for verification, and the sources of the information thus acquired are preserved by the publishers in support of the genuineness and authenticity of the work; and it is confidently affirmed that if the present issue be in some respects imperfect it gives in a well-arranged form such insormation as cannot be obtained elsewhere. The work is admirably arranged and well printed, and substantiates in every respect the claims made for it.

* "The Illustrated Guide and Directory of Manufacturers of Great Britain an Ireland." Edited by R. S. BARKER. London: Samuel Deacon and Co., Fleet-street.

THE YEAR-BOOK OF FACTS.—The appearance year after year of the volume bearing this title is so anxiously looked forward to by a large number of readers that it is merely necessary to announce that the edition for 1873 is now issued to ensure it a favourable reception. The present volume is embellished with a well-engraved portrait of Dr. W. B. Carpenter, F.R.S., and the vignette on the title page shows the Central Rotunda of the Vienna Universal Exhibition, which will shortly open. The obituary notices of persons eminent in science, art, and literature is unusually full and interesting, and the extracts being, as usual, carefully classified, according as they relate to the Mechanic and Useful Arts; Physical, Natural, Electrical, or Chemical Science; Natural History and Meteorology, the progress of any particular subject can be readily ascertained. The volume is in every respect equal to those of the same series which have preceded it.

LONDON GENERAL OMNIBUS COMPANY.—Traffic returns for the week ending March 9, 8834*l.* 3*s.* 7*d.*

Meetings of Mining Companies.

THE SOUTH CLEVELAND IRONWORKS COMPANY.

A general meeting of shareholders was held at the City Terminus Hotel, on Monday,—Mr. C. J. APPLEBY, C.E., in the chair.

Mr. CHARLES FRASER (the secretary) read the notice convening the meeting.

The report of the directors stated that the original intention of the company was to erect its own smelting furnaces and works, but this was abandoned, in accordance with the unanimous resolution of the shareholders at the meeting held on May 4, and the purchase of the Glaisdale freehold estate, with its three blast-furnaces, accessories, and mine, was then decided upon; the Esk Valley property being also retained, and the ironstone therefrom smelted at Glaisdale. The wisdom of this decision has been abundantly proved by the result. The net profit on the nine months' trading, after deducting interest and all charges, has been 44,858*l.* 17*s.* 11*d.*; from which has been written off for beneficial interest in the contracts for minerals consumed during the past nine months, 22,652*l.* 11*s.* 6*d.*; there remains for appropriation a net profit of 22,206*l.* 6*s.* 5*d.* Of this sum 4135*l.* 15*s.* was divided among the shareholders in August last, leaving an available balance of 18,070*l.* 11*s.* 5*d.*, which the directors recommend should be applied as follows:—to the payment of a dividend for the last half-year, free of income tax, of 1*l.* 12*s.* per share, being at the rate of 16 per cent. per annum. This will absorb 11,992*l.*, and leave 6098*l.* 11*s.* 5*d.* to be carried forward as a reserve fund and for depreciation of plant, contingencies, &c. If the original intention of the company had been carried out the shareholders would now be receiving only 4 per cent., or interest at the rate of 8 per cent. per annum, and this sum would have come from capital during the construction of the works. We should now be about to take possession of the new works in times of unprecedented difficulty in obtaining fuel even at the all but prohibitive prices now current, which, however, it was impossible to forsee a year ago. With regard to future prospects the directors see no reason to doubt that the present year will be a prosperous one, and they have already made advantageous contracts forward both for the supply of fuel and for the sale of iron. The increased demand for hematite iron has determined the directors to employ two of the three furnaces at Glaisdale for the production of iron of that quality, and it will be satisfactory to the shareholders to learn that this company's brand is held in such high esteem that it is extensively used by the most celebrated steel and iron manufacturers both in this country and abroad. In view of the steadily increasing demand for Cleveland pig-iron the directors have ordered the materials for a fourth furnace with the necessary calcining kilns and accessories; a large portion of these materials is already delivered and paid for, and the work of erection will be commenced as early as possible. Important improvements and additions to the existing plant have been designed by the company's consulting engineer, and are now being carried out by the manager under his superintendence. Owing to the great delay in obtaining materials these works are still incomplete, and the beneficial results to be obtained from them have not yet been realised. New cottages for the miners are being erected at Esk Valley and at Glaisdale, and it is proposed to build a further number during the present year. In order to carry out these important works, which the directors are advised will add greatly to the permanent prosperity of the company, and to provide the additional working capital commensurate with the increase of their business, it will be necessary to issue the unallotted share capital, which will be offered to the present proprietary in proportion to their holdings, and of which due notice will be given. The directors will continue to devote their close attention to advance the interests of the company to their utmost, their policy being to make the stock of the company a good permanent investment, not only in the present favourable times but when the trade returns to its normal state.

The CHAIRMAN said the report, in conjunction with the balance-sheet, would probably convey to the minds of shareholders an accurate idea of the value of their property. The accounts showed that during the nine months' working the net profit had amounted to 44,858*l.*, which was equivalent to something over 37½ per cent. upon the capital of 150,000*l.* He explained at the meeting in May that they were anxious to keep down the capital to the lowest amount compatible with the interests of the shareholders, and had proposed to practically reduce it by writing off the beneficial interest attained in the contracts they took over from the former proprietors of the Glaisdale Works. Those contracts were made at prices very much below the current rates when they took the works, and in order to reduce the capital account they assessed the value of the company at 25,000*l.*; they proposed to write off *pro rata* with the quantity of materials used a sum which in the total would represent 25,000*l.* Nearly the whole of the materials so purchased had been used, and they had written off from their earnings the sum of 22,652*l.*, so that there only remains 2347*l.* to be written off to complete the sum at which they assessed the value of the contracts. The mode adopted, practically came to this—they had reduced their capital by 25,000*l.*; but inasmuch as it took 2500*l.* to pay 10 per cent. upon that 25,000*l.*, it appeared to the board they had for all time benefitted the company to that extent per annum. They were now making large profits, but they must recollect there had been periods of depression and keen competition, and those times might recur, and whenever they did there would be 25,000*l.* less capital to pay upon. If the original intent had been carried out they should now be receiving 8 per cent. per annum interest; therefore, it could not be but satisfactory to the shareholders to receive from legitimate earnings a dividend of 16 per cent. per annum after writing off the large sums he had enumerated, and still having a sum of 6098*l.* to carry forward to a reserve fund. (Hear, hear.) It would be the endeavour of the board to increase that fund from time to time. In all manufacturing operations each year sees some advance and improvement upon its predecessor; recent experience had shown that within certain limits an increase in the stove-power was of very great importance. By improvements in blast-furnaces a less consumption of fuel took place, while a considerably increased yield was obtained, besides some sensible improvement in the quality of the metal turned out. The economy acted in every direction, for whatever increase of yield the standing charges were not at the same time increased, although distributed over a larger area. They, therefore, some time ago had the necessary plans made by Mr. Hill, their consulting engineer, in conjunction with their manager, and the materials required were contracted for, and he was happy to tell them at prices much below what the same work could be done for now; but a large number of their neighbours were moving in the same direction—hence there had been considerable delay in receiving these materials, and up to the present the improvements proposed to be made had not been brought into operation. He was at the works last week, and was glad to see a large quantity of the materials on the ground, and they would, he hoped, before long derive some advantage from these improvements, and very sensible ones. It had also been decided to erect a fourth furnace, having ample blowing power, and—what was of considerable importance—ample space for the deposit of waste product and slag, therefore, they could see they could increase their plant at a much lower cost than could be done by most firms. The great value of bricks and building material—of which a large quantity were required in the construction of a furnace—caused them to look about to see whether they could not economise in that direction; and upon examining their own property they found in a field adjoining their ironstone mines a fine bed of clay: they had, therefore, bought brick-making machinery, and are now about to commence to erect the necessary plant for making bricks, and he believed they would be able to turn out all the bricks required for their furnace, stoves, and cottages, at something like 22*s.* per 1000, their manager said 20*s.*—he thought shareholders might congratulate themselves upon that fact. (Hear, hear.) From the mines at Glaisdale a great deal of stone had been raised, and he was glad to be able to inform them the quality was fully equal to what it was anticipated it would be, and that the thickness of the stone was somewhat in excess of what it was thought it would be. The mine was now being opened, and they would very shortly raise large quantities of stone, but it had been found necessary to build a larger number of cottages, because they found everywhere that those who gave the best accommodation to their workmen got the best class of men, and men who remained permanently. Increased cottage accommodation was absolutely necessary, because when the fourth furnace—which would be a very large one—was in operation they would be raising very much more stone than hitherto, and a considerably larger number of hands employed. They were developing at Esk Valley rapidly, and a few cottages were built there last year, and they could not keep the workpeople out of them—they would go in before being made fit for occupation, so there was no fear of getting men when house accommodation could be provided. About 28 or 30 cottages would be finished in a week, and about 20 were in occupation. He might mention that a return was sent from the works every day, and every month a full return was made of everything that had gone on: the daily returns were carefully examined and compared with the monthly returns, besides which one or other of the board was frequently at the works, and Mr. Yeoman (who resided at Whitby), one of their colleagues, was constantly backward and forwards, and they had every confidence in their manager. To carry out the improvements and additions to which he had referred further capital would be required: their object had always been to keep the capital down to the lowest point—at all events, till such time as they saw clearly their way to its profitable employment. They now proposed to issue the unsubscribed capital, consisting of 2500 shares. It had been suggested to issue those shares at a premium; but looking at their first profits, and what may be fairly anticipated for the future, it was not unreasonable they should be issued at a premium, but as the whole of those would no doubt be taken up by their own shareholders the board thought, on the whole, it would be desirable to issue them at par to them *pro rata* with their present holding. Some shareholders had enquired why the shares were not quoted on the Stock Exchange; it might be as well to explain that as they were about to issue their remaining capital it would be undesirable to ask for a quotation till it had been issued; that done, a quotation would be asked for if the shareholders wished it. All he could add was that it had been the endeavour of the board to further the interests of the company, and they would use their best ability to be as successful in the future as in the past. (Hear, hear.) He then moved that the report and balance-sheet be received and adopted.

Mr. COATES seconded the proposition. He thought the shareholders ought to be satisfied.

The resolution was put and carried unanimously. A dividend of 1*l.* 12*s.* per share (being at the rate of 16 per cent. per annum) was declared.

The auditors were re-appointed.

Dr. SMITH suggested the reserve fund should be employed in the building of cottages.——The CHAIRMAN said the board thought the employment of the reserve fund should be left to their discretion, to be employed as they might deem desirable from time to time. He thought the cost of constructing cottages should come out of capital.

Dr. SMITH asked what number of additional cottages it was proposed to build?

The CHAIRMAN said he could not state with any degree of certainty; he only returned from the works on Saturday, and the board had not yet conferred upon the matter; his own impression was that there should be something like 50 or 60. Be-

sides this accommodation, the board were doing several other things as likely to contribute to the welfare of the workmen—as, for instance, they had voted 60*l.* towards fitting up an athenæum, provided with a room for musical entertainment; there was also a reading-room in connection, which was so well managed that a question arose the other day as to how the surplus funds should be invested.

An extraordinary general meeting was then held, when a resolution was passed reducing the legal quorum necessary to constitute a general meeting.

It was also resolved that future general meetings be held the second Tuesday in March of each year.

Mr. COATES proposed a vote of thanks to the Chairman and directors for the satisfactory way in which they had conducted the business of the company during the past year, which had been a most difficult one, on account of strikes and the abnormal condition of the coal market.

The resolution being duly seconded, was being put and carried unanimously.

The CHAIRMAN having acknowledged the vote, stated that the business of a company like this did require very close attention, and especially in times like the present, when prices were up and down so rapidly. That attention had been given, as he had already said, and shareholders might fully rely upon the board that they would continue to do the best for the true interest of the company. (Hear, hear.)

The meeting then separated.

TERRAS TIN MINING COMPANY.

An extraordinary general meeting of shareholders was held at the London Tavern on Tuesday, for the following purposes:—To take into consideration the present position of the company and its affairs; to take into consideration the advisability of increasing the capital of the company; and to propose, and, if deemed advisable, to pass resolutions increasing the capital of the company.

Mr. MATTHEW GREENE in the chair.

The notice convening the meeting was read.

The CHAIRMAN said, as he had only just become acquainted with the company, it was a difficult matter for him to explain the position of the company, which was not lessened by the fact that the directors had been unable to obtain either the cash or banker's books. The late Chairman of the company some short time ago resigned, and Mr. Pearce, his nephew, the secretary, had also resigned. As to Mr. Martien, who originally undertook to erect certain machinery which was to have been completed by Dec. 31, of last year, in consequence of the resignation of the Chairman and secretary, the remaining directors thought proper—and justly so—to close the contract with him, hence the present condition of the company. There were no books or vouchers, although some 7000*l.* worth of tin had been sold. He had seen a balance-sheet made up some time since, which had been audited by someone also of the name of Pearce, but still there were no vouchers forthcoming. Several items appeared as having been paid, for which claims had since been sent in; and the liabilities were beyond the company's means of paying them to the extent of something like 3000*l.* His (the Chairman's) connection with the company had been so short that he had not had time to visit the mine, but he had succeeded in obtaining the opinion of a well-known authority, Mr. John Kendall. It was in consequence of Mr. Kendall's report (an abstract of which appeared in last week's Journal) that he (the Chairman) consented to go into the Terras matters; but upon going into the financial condition of the company, he found it would be quite impossible to proceed, and must be wound-up unless the shareholders provided further means. In the absence of accounts it would be fruitless to appeal to the public, and therefore the additional capital which was absolutely necessary must come from the shareholders; and, according to the reports of Mr. Kendall and Captain Nicholls, the condition and prospects of the mine justified the additional capital proposed to be raised. He should like to have seen Mr. Martien present, and also the late secretary, but the latter gentleman had been taken very poorly, and the a medical certificate had arrived.

A SHAREHOLDER asked if there was no power to compel the late secretary to deliver up the company's books?——The CHAIRMAN said that was a question it would hardly be well to discuss. Nothing was to be gained by holding out threats. They were anxious to save the company from going into liquidation—there were really no unissued shares, except some one or other had a lien upon them. The capital was 25,000*l.* Advertisements had appeared in the Cornish papers, asking all merchants who had claims to send them in, so that there was reason to suppose they now knew the extent of the company's indebtedness. Before going into the matter of increase of capital, he suggested the manager (Capt. Nicholls) should read his report.——The report was read, as follows:—

March 8.—The clearing of the north adit is being proceeded with, and operations may soon be commenced on the north lode, which, so far as can be seen at present, is 3 ft. wide; and, judging from the ground taken away by the ancients, together with the nature of the strata, &c., I am of opinion on being fairly developed this will prove one of the most productive lodes in the mine.—Barstow's Lode: The shallow level on this lode is producing tinstuff of good quality, and we expect by driving a few fathoms more to meet with the intersection of this lode and George's lode, where an improvement may be expected. The ancients worked rather extensively on this lode shallow, and, looking at the quantity of ground they stoped, with tin at a very low price, together with the fact of their having only horse and manual power to pump the water and draw the stuff, we may fairly assume that it will now pay to properly develope, especially as by driving a few fathoms either way an intersection of lodes will be met with. George's lode was formerly worked to 20 fms. deep by means of water-power; it yielded considerable quantities of tin, and, taking into consideration the fact of the elvan yielding tin where the lode crossed it, is another proof of its productiveness. I am, therefore, strongly of opinion that no time should be lost in fixing one of the portable engines now on the mine to drain the shaft, in order to give this lode a fair trial, and by driving west the elvan will be drained, and some parts of it will pay for working. The adit level is being driven north on the elvan, to intersect Blencowe caunter lode, which is said to be one of the most productive lodes of the district; and, as Blencowe Company have erected a 70-inch engine on this lode, within a few fathoms of your sett, it may be worked at a good depth without erecting any pumping power.—Edwards's Lode: A 50-inch engine is erected on this lode, and the shaft sunk 40 fms. deep. The 20 and 30 fm. levels have recently been started, and we expect an improvement for tin to the east of the elvan. The 20 and 30 fm. levels west are also being driven; the lode in each yields a little tin, and as by driving these ends an intersection of lodes will be met with, I consider it a promising feature. From the foregoing you will perceive that the development of the two most important lodes—George's and north lode—have hitherto been entirely neglected; and, taking this into consideration, together with the geological position and strata being good, I am of opinion that a vigorous and miner-like development will lead to good results.—J. NICHOLLS.

Mr. PEARCE said that as reference had been made to his resignation as director, it was hinted to him that, as Scotch gentlemen held a large interest in the mine, the company should be managed in Scotland, whereupon he resigned his position, and any other man could have been at liberty to do the same. No one could blame him for giving up that position.

The CHAIRMAN said he had not conveyed that impression. All he wished the shareholders to know was that he had been unable to get any accounts.

Mr. PEARCE said he had received a letter from his nephew, enclosing a doctor's certificate. He (Mr. Pearce) had telegraphed him very strongly, urging him to be present at this meeting, and he was present; he fully believed he had not done anything wrong. Every book belonging to the company had been sent to Mr. Calder.

Mr. CALDER said he had handed to Mr. Greene all the books he had received.

The CHAIRMAN said there was no cash-book.

Mr. PEARCE said his nephew had had nothing to do with the cash-book. No doubt the tin had been sold, and the proceeds applied for the benefit of the company, and would be found embraced in the accounts.

The CHAIRMAN said, as far as the late secretary was concerned, there were no books, but he had no intention to import himself into personalities.

Mr. PEARCE did not believe the late secretary had a book belonging to the company.

The CHAIRMAN said he ought to have, had he conducted his business properly.

Capt. NICHOLLS (the manager), in reply to questions from different shareholders, stated that very little had been done upon the lodes themselves, the tin having been raised from the points where the lodes cross the elvan. There were many places working on these lodes that would pay; but, as a whole, the elvan would not pay.

The CHAIRMAN mentioned that the mine was amply provided with machinery and stamping-power, and if only good average tinstuff could be obtained handsome returns would be made.

Mr. BARSTOW asked if Mr. Kendall's report confirmed that by Capt. Nicholls?

The CHAIRMAN replied in the affirmative, adding that it it was a little more favourable.

Mr. HERRON asked if the "ancients" had worked the elvans?——Capt. NICHOLLS said they had worked them to some extent to the water level. He did not recommend the prosecution of that level, but he did recommend working the lodes to a greater depth; a considerable portion of those lodes would pay very well.

Mr. HERRON asked, if the lodes had been developed, whether the mine would now be in a paying condition.

Capt. NICHOLLS said if the same amount of money had been expended upon the lodes as had been invested upon the elvan he believed the mine would now be in a dividend-paying condition.

Mr. JOHN KENDALL said the working on the lodes was the chief feature in the mine, which up to this time had been neglected. Working on the elvan was, he thought, a mistake—indeed, enough had been done to prove that. At the junction of the lodes with the elvan no doubt something might be found to pay; but if two-thirds were worthless it would take away the value of the remaining one-third. That which had been stamped had better been left alone than worked at all. It would have been much better if one-half the money had been spent, and that upon the lodes, which were—particularly the north one—masterly and strong. The old workers had worked upon the lodes, and not upon the elvan course, and they could not have a better guide than to follow the "ancients," because they worked for themselves for their own livelihood—the "ancients" worked upon the lodes, and not upon the elvan course. Therefore, whatever capital was about to be spent should be upon the lodes; and by so doing he had no doubt from what he could see there was a very fair chance of getting something profitable.

Capt. NICHOLLS said that 7000*l.* worth of tin had been obtained, principally from the elvan, where George's lode crossed it. He proposed working the lode, and for that purpose intended erecting the engine now on the mine. As there had been tin so near the surface there was no doubt a large deposit would be found 24 fms. deeper—that was the usual result in all tin mines. Certain it was that if the lodes were not productive the elvan course would not be productive. The Blancoe Mine had spent a large sum of money to prove one lode alone, which had not yet been intersected in Terras.

A SHAREHOLDER said that, considering 7000*l.* worth of tin had been raised to meet the cost-sheet, 7000*l.* had been accounted for.

The CHAIRMAN said that 7000*l.* appeared to be the amount, from what little accounts they had; but it did not appear from the books of the company that anything had been done at a profit.

Mr. KENDALL said that large quantities of stuff taken to the stamps was worthless. In properly conducted tin mines samples were taken from the lode, and that which would not pay was thrown aside, and that which would pay passed through the stamps. He could not find any books upon the mine which contained this information. It seemed that everything that came from the mine was put to stamps whether it was worthless or not. He saw no books, but in all well conducted mines books were kept showing what the stuff was worth before it was taken to stamps.

Mr. COMYN endorsed what Mr. Kendall had stated. He was utterly astonished at the amount of work done—the whole of the rock, which did not contain a particle of tin, had been taken to stamps at an immense cost. To have obtained one ton of tin the value of two tons must have been expended. Although he did not profess to be a miner it was a perfect farce to him, as it must be to any man of common sense, that such excavations had been made upon such worthless stuff. There was no evidence to show when 7000*l.* worth of tin was got out of it. There was no doubt profits could be realised if the mines were worked upon a miner-like principle—that is to say, by attacking the lodes.

The CHAIRMAN said it was but justice to Capt. Nicholls for him to state that as he had only been the manager of the mine for two months he was not the party who was now being flagellated. He held proxies for about 12,000 shares in favour of the Chairman, whoever he might be, and there was a disposition among a very wealthy proprietary to subscribe for the necessary additional capital which was so urgently necessary to save the company. It was clear that if it were not the shareholders' interest to subscribe the necessary capital it had never been wise on their part to subscribe for a single share. He then proposed that the capital of the company be increased by the creation of 10,000 additional shares of 1*l.* each.

Capt. ATKINSON seconded the proposition, which was put and carried unanimously.

The CHAIRMAN then proposed that 5000 of the said 10,000 additional shares be now issued, in the first place *pro rata*, at par, to the proprietors holding shares on March 12, 1873; and the directors shall have power to issue 5000 additional shares if afterwards found necessary. The Chairman explained that these resolutions really created nearly 12,000*l.*

Mr. T. HAMILTON suggested that those who now came forward and took up the 5000 new shares at par should have the option of subscribing for the remaining 5000 at the same price in the event of the whole being issued. It would give them an advantage if the shares ran up to a premium, as in the case of the Van Consols.

The CHAIRMAN said that, although that stipulation could not be inserted in the resolution, the directors would pledge themselves that the suggestion should be carried out.——Mr. WHITLEY seconded the proposition, which was put and carried unanimously.

The CHAIRMAN then proposed that the first said 5000 shares be paid for as follows:—5*s.* per share on application, 5*s.* per share on allotment, and the remainder as required; not more than 5*s.* per share being called up at one time, and at not less than one month's notice. He added that, as several shareholders had expressed their desire to pay up in full, the directors intended to allow those who did so a discount of 3 per cent.

Mr. T. S. BANBURY seconded the proposition, which was put and carried unanimously.

The CHAIRMAN next proposed that all shareholders not taking up their proportion of these shares within the time to be specified by the directors for so doing, shall lose all right and title to the same; and the directors shall have power to dispose of the said shares for the benefit of the company.

Mr. CALDER seconded the proposition, which was put and carried unanimously.

The CHAIRMAN said Mr. Barstow represented a very large number of shareholders, and it could not fail to be of material advantage to the company to have his name connected with the company as a director. (Hear, hear). He would, therefore, propose that Mr. Barstow, Mr. White, of Edinburgh, and Mr. J. E. W. Calder be elected directors, with power to appoint two London directors.

Mr. T. HAMILTON seconded the resolution, and it was put and carried unanimously. A vote of thanks was passed to the Chairman, when the proceedings terminated. There were about 14,000 shares represented at the meeting.

FORTESCUE TIN MINING COMPANY.

The second general meeting of shareholders was held at the offices, New Broad-street, on Wednesday,—Dr. TAYLOR in the chair.

Mr. N. M. BYERS (secretary) read the notice convening the meeting.

The report of the directors stated that they have much pleasure in submitting the reports on the mine from their managing director and mine captain. They congratulate the shareholders on being in possession of one of the richest mining properties in Cornwall. During the past year they have considerably increased its value by the purchase of a portion of the Godolphin Mine, thus materially adding to the value of the lodes which were originally in the possession of the company. The necessary buildings have nearly been completed, and the steam-engine and gearing purchased, but operations have been much retarded by the late rains, which have flooded the shafts. There are, however, about 400 tons of tinstuff at grass, and as soon as possible after the stamps have been set, a sale of tin will be made. The probable necessary expenditure to bring the mine into a dividend state will, it is estimated, not exceed 1200*l.* After this expenditure has been made it is believed that regular and quickly following returns will be obtained, and that the shares, which are even now at a premium, will rise very rapidly in value. Hundreds of thousands of pounds have been made by adjoining mines where the geological formation was of the same character as is presented by the Fortescue.

The CHAIRMAN said he had very much pleasure in congratulating the shareholders upon the satisfactory character of the reports submitted upon the present occasion. It was evident from those reports that they possessed a very valuable property. The number of lodes, their value at the several points of contact, indeed everything, warranted the expectation that ere long large returns of tin would be made. Returns could now be made if the machinery had been erected to unwater the lodes and to crush the ore that was accumulated on the surface. He had much pleasure in saying that he could corroborate the reports by his own personal observation, having been upon the mine some six or eight times during the last ten months. He was attracted to it by a work he had read—Dr. Boase's "Geology of Cornwall"—in which that writer stated that all the richest mines in Cornwall were intersected by elvan courses; for instance, Dolcoath, Carn Brea, the St. Agnes Mines, Great Hewas and Polgooth, had all the same geological formation. He was in search of that geological formation long before he knew anything about Fortescue, and thought he had found it in another mine; but the evidences he had found in Fortescue satisfied him that they possessed a mineral property of very great value. Immediately after Fortescue started he associated himself with it, along with a large number of friends, all of whom took a very deep interest in it; and he was now very happy to meet the shareholders and to be able to tell them that there was a very great future in the mine in which they were interested. He thought that, as soon as the machinery was in order, large returns of tin would be made, giving to the shareholders very acceptable dividends. (Hear, hear.) The weather during the last four months had greatly retarded their operations, but from the statements that would be made it would be seen that in a very short time crushing of tinstuff would be commenced, and he had no doubt the amount of tin returned would be something very considerable, and that the result would be very gratifying to all who held an interest in the company. This meeting should have been held last month, but in consequence of his absence from home the report of the directors was not sent back to the office in time to give the proper legal notices to the shareholders; the delay that had taken place had not been without its use, for, during the last fortnight, some valuable lodes had been found, samples from which were upon the table. He had understood there were gentlemen present who had just returned from the mine, having, after a personal inspection, taken a considerable interest in the company. He was sure they would be a source of great additional strength in the successful development of the property. He then moved that the reports be received and adopted.

Mr. HOSKEN seconded the proposition.

Dr. WEBSTER enquired the percentage of tin contained in the samples on the table and the ordinary percentage contained in the general run of Cornish tin ores.

Mr. JAMES (the managing director) believed that no part at which the lode had been struck was below 1 cwt. to the ton of stuff, and the average produce was something about 2 cwts., which was greatly above the average of the county. He then enumerated the value of the different points of operation, stating that their average value would make a produce of 2½ cwts. of tin to the ton of stuff.

Mr. PERCY MILFORD asked the value of the ore in sight?

Mr. JAMES estimated that at the 10 fm. level they would lay open a very considerable quantity of tin ore, and he should estimate there were 400 tons of ore at surface, which was worth 40*l.* or 50*l.*

A SHAREHOLDER asked what royalty was to be paid upon ore from the Godolphin Mine?——The CHAIRMAN said the royalty was 1-18th for both mines, the lord being the Hon. James Fortescue.

Mr. JAMES said the lodes would no doubt increase in richness in depth. They were as yet only 18 fathoms deep.

Mr. G. SEROCOLD asked what amount it would require to develope the mine into a paying property?——Mr. JAMES said about 1200*l.*, but it was impossible to say with certainty what sum would be really required. To open the mine in a thoroughly practical manner, so as to always keep some reserves in sight they should first sink 10 fathoms under the old workings, and then drive levels. No further machinery would be required. By the old tools found in the mine it was clear the Phœnicians worked as far as they could go; there being no motive-power in those days, they were unable to pump the water. They carried their workings deepest were the lodes were richest, and these places the present company had continued until powerful machinery became necessary, which had been erected, and would go to work in the latter part of the month; but, as he had already said, they would have to sink 10 fathoms under the old working and drive levels east and west, and cross-cut north and south, and so lay open backs—that was the only way to work the mine practically and efficiently. The present engine would take them down to a depth of 70 fathoms, and there would be no increased requirements for machinery. The price at present being paid for driving was 6*l.* per fathom, and the monthly cost about 350*l.*

The CHAIRMAN said that their managing director computed the mine could be put in a paying condition for 1200*l.*, and he was glad to be able to inform the shareholders that the board had more than that amount to expend upon that mine.

Mr. B. C. HOOKE (a director) said he recently visited the mine, accompanied by two gentlemen about to join the board. Having met Mr. James on the property, they visited every available point, and one of the gentlemen went down the engine-shaft close by the caunter (marked red in the plan). In a casual way two samples were taken from the lode, and in their presence were pulverised and assayed, and gave a produce of 2 cwts. 3 qrs. 6 lbs. per ton. The fact was telegraphed to the office, to which a reply was received from the secretary "that the news was too good to be true." The next morning he again went to the mine and had the assay repeated, when within 1 lb. the same satisfactory result was obtained. As 9 lbs. per ton would pay the working expenses, the difference between that and the actual yield would be so much profit. The day before yesterday a gentleman of great scientific attainments saw the specimens in the office, who, after a careful examination said he would pledge his professional reputation that they would yield from 18 to 20 per cent. of tin—that is, equal to 3½ or 4 cwts. to the ton of stuff. He further mentioned that the Hewas lode extended across the Fortescue property, and that upon a very small expenditure had yielded something like 500,000... Some rich stones of tin were handed round the room, which Mr. ... he had broken the day previously at a depth of only 3 fms. from surface.

Mr. HOOKE added that there were very strong evidences that here... would also be found, so that, taking all facts into consideration, he thought... holders might consider they possessed the queen of Cornish mines.

Mr. G. HAMLEY mentioned that he was connected with a mine that was ... privately worked, that was giving a profit of nearly 3000*l.* per annum from ... that yielded only 4 lbs. to the quarter.

Dr. WEBSTER suggested that as the prime producers of an article, their ... fund should be placed in a position which could be realised at a moment's ... and moved a resolution that the reserve fund should be invested in Government ... railway securities.—Mr. SEROCOLD seconded the proposition, which, however, ... withdrawn upon a statement from the Chairman that when a reserve fund ... have been accumulated it should be invested as directed.

Mr. B. C. Hooke was re-elected director.

Upon the proposition of the CHAIRMAN, seconded by Mr. MCKENNA, the ... ing gentlemen having taken a very large interest in the company were unanimously elected directors:—Dr. Webster and Messrs. H. E. Desmond and G. P. ...

Mr. F. J. Steward was re-appointed auditor.

A vote of thanks to the Chairman and directors was then passed.

The CHAIRMAN, having acknowledged the vote, stated that he took a ... terest in the mine, and looked after it as if it were his individual property, ... proposed to continue his active supervision until he saw that good returns ... being made, when he would delegate his office to some other shareholder.

The meeting then separated.

CRENVER AND WHEAL ABRAHAM UNITED MINING COMPANY.

A general meeting of shareholders was held at the City Terra... Hotel, Cannon-street, on Thursday,

Mr. HORACE GREEN in the chair.

Mr. GEORGE H. CARDOZO (the secretary) read the notice ... vening the meeting.

The report and balance-sheet (abstracted in last week's Jour... were taken as read.

The CHAIRMAN said it afforded him much pleasure to be in a ... tion to be able to preside at a meeting of this complexion, ... ing been one of the labourers who had borne the burden of ... pointment so long and patiently. The statements already ... lated having been somewhat exhaustive, he confessed he had ... to add, but would request the secretary to read a supplemen... report, received yesterday from the agents, confirming and ... ing the hopeful intelligence of the last three weeks. The ... had, moreover, secured the attendance of one of the agents ... could best be spared, and Capt. Paull would afford verbal ... tion on any points of doubt. Before reading the reports he ... refer the meeting to the obligations the proprietary were under ... Messrs. Stratton and Pickering, who had at great pains and ... gone underground and inspected the property there as well ... the surface.——The report was read, as follows:—

March 10.—The following is a summary of the work done since the last ... meeting of shareholders:—Sinking and rising on the course of the lode, ... 1 in.; driving cross-cuts north and south, 16 fms. 5 ft. 5 in.; driving ... and west of the different shafts, on the course of the lode, 324 fms. 1 ft. ... 423 fms. 4 ft. 11 in., which have laid open a large extent of ground ... mines, some of it being very valuable. For instance, in the 200 fm. level ... Vivian's shaft, the lode is 5 ft. wide, worth 50*l.* per fathom for copper ... end, which is set to drive (on tribute) at 1*s.* 9*d.* in 1*l.*, to six men, is extended ... to the east of Woolf's shaft; the shaft having been sunk by the old ... 190 fm. level, we are now engaged in clearing it below the 190, so that we ... our position; we think we shall require to drop a small lift to drain it to ... (to be worked by the man-engine rod); this we intend doing as quickly as ... in order to communicate with the 200 fm. level; after this is done we ... mence to sink Woolf's shaft on the course of the lode. In the winze sinking ... the 190 fm. level, 40 fms. west of St. George's shaft, the lode is 5 ft. wide, ... 100*l.* per fathom for length of winze (12 ft.); there can be no doubt that the ... connection with the course of copper ore in the 200 end, east of Vivian's ... driving the 203 end, west of St. George's shaft, 18 fms. distant from shaft ... is 3 ft. wide, yielding 3 tons of copper ore per fathom (15*l.* value), and ... they improve; this is an important feature, as it clearly shows that the ... ore gone down in the 190 is lengthening in depth. In accordance with your ... Pelly's engine-shaft has been sunk below the 234 fm. level with all ... and is now down 10 fms. 1 ft.; the part of the lode sinking on is small and ... ductive. We would recommend this shaft to be sunk 14 fms. below the ... divide, and bed-plank it to that point, and then drive south, to ascertain ... is not a part of the lode gone off in that direction, we being of opinion that ... We have sunk Sturt's engine-shaft 2 fathoms below the 215 fm. level; ... 1½ ft. wide, unproductive: we intend to go down another 6 ft., and put ... and cistern to fix a plunger-lift at that point. The lode in the 215 fm. ... is driven west of shaft 17 fms., has been from 2 to 3 ft. wide, ... 1 ton of good copper ore per fathom; it is now only 1½ ft. wide, and ... The lode in the 180 fm. level, east of Bull's shaft, is 1½ ft. wide, ... good stones of grey copper ore,—Crenver Shaft: In the 190 end, 124 ... shaft, the lode is 1 ft. wide, having the killas on each side, but unproductive ... granite we met with did not last long, but there is no doubt on our ... shall meet with it soon, when we may reasonably expect it to become ... tive for tin. In the rise in the 160 fm. level, which is 100 fms. east of ... lode is 2½ ft. wide, producing good stones of tin and copper, having a ... pearance. The 120 fm. level cross-cut, south of Woolf's shaft, is ... from the old lode; the ground is mineralised, and easier for progress, which ... us to believe we are not far off from one of the south lodes.—Pelly's Engine-... The lode in the 234 end east is disordered by cross branches, although ... good stones of tin. The lode in the 234 fm. level west is 2 ft. wide, ... of copper ore per fathom, and some tinstuff to dress. In the winze sinking ... the 220 fm. level, 22 fms. east of shaft, the lode is 2 ft. wide, ... per ore and some tinstone to dress per fathom. The lode in the 220 end ... wide, producing good stones of copper ore. In the 210 end, which was ... to drive from this shaft, but is now extended 10 fms. east of Vivian's ... communication has been made since the last meeting; the lode split into ... and just now unproductive. The sinking of Blewitt's and Richards's ... as the driving of the 180 and 170 west is being pushed on to prove the ... this direction, which is "in whole" to the 100, but the lode at present ... ductive at each of the points. Many practical mine agents have set great ... this part of the mines. In conclusion, we beg to remark that our present ... copper have very much improved since the last general meeting of ... but there has not been such a marked improvement in the tin department ... believe our returns of copper ore will considerably increase during the ... months.—WM. KITTO, WM. THOMAS, JOHN VIVIAN.

He proposed, in the first instance, that the report and balance-... should be received and adopted; but, on a suggestion, proposed ... adoption of the balance-sheet separately.

Mr. MCNAMARA, Mr. ANDERSON, and other shareholders ... points as to matters of account, which were deemed by the ... to be satisfactorily disposed of.

Mr. HARDIE asked if any sum were still due to the vendor?

Sir CHARLES WINGFIELD asked for information as to a ... litigation?——Mr. ROSTRON asked if the title of the company ... various leases comprising the sett was complete?

The CHAIRMAN, before replying, put the motion to the meeting ... the adoption of the balance-sheet, which was carried *nem. dis.*

Mr. STRATTON (a director) said that at the last meeting he was ... the other side of the table. Upon that occasion he expressed great dissatisfaction ... at the position and prospects of the enterprise; since then the board had ... to become a director, and he had accepted that position, and had acted in ... pacity for the last five months. He found it to be a much heavier task than ... one could have possibly imagined. His inspection of the mines had been a ... of very great satisfaction. Previous thereto he had privately engaged the ... of Capt. Rich, who had inspected the mines and furnished a report upon them, ... could be perused by any shareholder, although it would afford them as little ... mation as it did him. He asked Capt. Rich whether the mine would pay ... to which he replied that he could not say. The property was situated in the ... of good mines. He further asked Capt. Rich if the mine were his own ... whether he would work it, to which he replied in the affirmative, adding that ... did not see any reason why it should not pay. He used to think that much ... tutwork should be stopped, but since his inspection of the property he had ... ther altered his opinion, for the greater the amount of tutwork carried on ... greater the chances of making discoveries. They had a mass of very rich ... in the 190, not equalled by the deposits in either Flagstaff or Emma: the ... was first class, the last sale realising 12*l.* per ton, the average being from 4*l.* ... ton upwards. This had induced him to form a very sanguine opinion of the ... of their property. This important discovery would not have been made ... their tutwork operations been discontinued. During the past two months ... than 100 tons had been extracted from this one level alone, and really, ... sole of the level was under water, and the six men working at a tribute of ... to 2*s.* 6*d.* in 1*l.*, managed to earn 20*l.* per man during the two months. ... day he arrived at the mine the lode at this level was unwatered, and he ... operation now was to abandon to a certain extent the 190, and stope ... ground in the 200 and 203 fm. levels. After careful deliberation, he had ... the conclusion that the mine should almost immediately balance the ... and receipts, as they had only 33 men on tribute and about 140 on tutwork. ... mines were so very extensive, comprising an area of about 1 and 1½ mile, ... plorations must be continued if successful results were to be realised, which ... believed would be the case if the property were properly developed. He was ... creedingly pleased to see everything in such perfect order at surface. He then ... at some length into the question between the vendors and the company, ... affected only the Crenver portion of the property. The vendors claimed 1500*l.*, ... the board had declined to pay that amount until the company possessed the ... of the Crenver Mine. He (Mr. Stratton) did not believe there was any real ... culty about the lease. The vendors had brought an action against the ... for the balance of the purchase-money (1800*l.*), which the company were ... If the vendors' claim were good there would be no difficulty in ... company to pay it, but at the very last moment they withdrew their notice of ... which could not now come on again before Trinity Term, which lasted only ... days, so that in all probability it could not come on till November. The ... did not intend to pay this sum unless compelled by law. The dispute ... merely to the Crenver part of the property, which can be of no possible use to ... body but the company.

Mr. S. ROSTRON asked who the parties were who had to give the lease?

Mr. STRATTON did not think it advisable to turn this meeting into a court of ... and to go into particulars might do the company a material damage.

The CHAIRMAN stated that the Articles of Association fully set out the agreement.

Sir CHARLES WINGFIELD said it would be unadvisable to go into this matter at a public meeting. He had perfect confidence in the board, whom he thought had acted wisely in resisting this claim.

The CHAIRMAN expressed an opinion that if any real difference had occurred between the company and the highly respectable firm who were the vendors of the property it had arisen from a regretable misunderstanding, and that by judicious counsel on the part of the respective advisers of the parties an amicable arrangement would be come to. The interest of the vendors was identical with that of the company, as they had an unsold interest of 6000 shares on the register. He thought it advisable not to debate these matters of difference in public, but to leave them in the competent hands to which they had been delegated by the action of the board. He added that, whatever the result might be, they had sufficient ground to explore in the remaining portions of their property that would fully employ their time and capital for many years, irrespectively altogether of the Crenver Mine. In reply to questions, he stated that the arrears of allotment money amounted to 216*l.*, due from six persons; the arrears on the first call amounted to 210*l.*; on the second, 1304*l.*; and on the last, 3117*l.*, which could hardly yet be called in default. He had nothing to add to the statements made by Mr. Stratton, except to endorse what he had stated in reference to the satisfactory progress that was being made in the development of the property. He did not indulge in prophecies, nor did he profess to be able to see through a fathom of ground, and therefore could give no warranty of dividends at any particular time. As Mr. Stratton had judiciously said, they hoped the expenses and receipts would soon be balanced, and they might talk of profits when the whole of the ground had been secured between the 190 and 200fm. levels, where there was every prospect of a rich copper mine. There was no doubt an important discovery had been made, but the ground was only just coming under control for extraction.

Capt. PAULL, in reply to a question, stated that it afforded him much pleasure to be able to inform the shareholders that they had attained a greater success than was expected; the 190 fathom level had yielded 100 tons of ore, which had given a produce of 15¾, and had realised 12*l.* 4*s.* per ton, which was sufficient to justify him in saying that it was beyond their most sanguine expectations.

Mr. PICKERING asked how many tons of ore would be sold from that level at the next sale, and how much at future sales? In the 190 the lode was now worth 100*l.* per fathom; in the 203 it was worth 7*l.* or 8*l.*, as against 4*l.*, and in the 208 it was worth 50*l.*, as against producing only a few stones of ore. From that great increase in the value of the different points of operation they might reasonably suppose that the next sale would realise over 3000*l.* from the three points alone. His conviction was, from what he had seen at the mine, that the returns would more than balance the expenditure, and that by June the mine should be in a position to increase its sales to over 5000*l.*

Capt. PAULL said that they must go on with their levels and put down a winze, and when a communication was made the ore could be broken away. They would probably have by next Tuesday 35 tons of ore, worth 10*l.* per ton from the 200, the lode being worth 5*l.* per fm.; the tributers had such good faith in the lode that they would rather take a tribute of 1*s.* 9*d.* than receive 4*l.* 10*s.* per fathom on tutwork. They would not raise so much ore until the winze had been sunk though, and probably the next two months' sale would not exceed 220 tons from every place.

The motion adopting the report was then put and carried unanimously.

Upon the proposition of the CHAIRMAN, seconded by Mr. HEDLEY, the election of Mr. Stratton as director was unanimously confirmed.

Upon the proposition of Mr. ROSTRON, seconded by Sir CHARLES WINGFIELD, the auditor (Mr. Edwards) was re-elected.

A vote of thanks to the Chairman and directors terminated the proceedings.

MORVAH CONSOLS TIN MINING COMPANY.

The first general meeting of shareholders (adjourned from March 5) was held at the offices, 15, New Broad-street, on Wednesday,

Colonel TREVENEN HOLLAND, C.B., in the chair.

The SECRETARY (Mr. Cunningham) read the notice convening the meeting, and the report of the directors, as follows, was taken as read:

The ordinary general meeting to be held on March 5 has been called for the purpose—1. Of submitting the accounts for the year ending Dec. 31, 1872.—2. Of electing a director in the place of Major E. B. Holland, R.E., who retires by rotation, but, being eligible, offers himself for re-election.—3. Of electing an auditor for the ensuing year, and fixing his remuneration. Since the last ordinary general meeting, held in London on March 6, 1872, extraordinary general meetings have been held on April 12, and May 3, 1872. The directors have now merely to report that during the past year the mining works have been actively progressing, the level has been entirely cleared out and the lode opened up, and found even more promising than the directors had reason to anticipate. The erection of sufficient machinery at a very moderate expenditure the directors have every reason to believe will produce from this lode alone sufficient ore to give a very remunerative return to the shareholders on their investment in this company. The balance-sheet, made up to Dec. 31, 1872, and duly audited, is attached.

The following extracts from the recent reports of the company's agent at the mine will show the state of the property:—

Dec. 26, 1872.—"I have at last the pleasure of stating that we have opened into Mason Foxe's shaft, and let off the water, which is most cheering and satisfactory. This has opened up all the old shafts which hitherto have been flooded, and given us, when the levels are cleared, the range of the old workings at the depth of our levels. We see the lode very clearly. It looks very promising."—Dec. 31: "I broke a stone of tin of very good quality, weighing over 30 lbs. This is very encouraging at our present stage of proceedings."

Jan. 9, 1873.—"Our lode has considerably improved since last report. Our prospects are most encouraging."—Jan. 16: "The tributers pull up tinstuff on Saturday next. What its value is cannot, of course, be ascertained until it is brought to surface and tried."—Jan. 23: "It gives me much pleasure to state that the ground, both in the end and with the tributers, has considerably improved in its tin-producing quality. The tributers are breaking some capital stones of tin."—Feb. 13: "On Monday we commence to take up the White Burrow shaft, below the adit level, so as to get at the deeper workings, that we may fairly estimate the practicability of erecting machinery and beginning on a large scale at once. I must again say that the more I see only confirms me in the opinion that our property will ultimately be a valuable one, when a reasonable outlay for machinery has been made, and commensurate vigorous opening of the mine prosecuted."

The CHAIRMAN having referred to his visit to the mine, and the satisfactory progress of the company's operations, further stated that the letters received from Capt. T. Bennetts since the preparation of the report, were equally, if not more, satisfactory, moved the adoption of the report and balance sheet.

Mr. FREDERICK BENNETT (one of the directors) seconded the proposition, which was carried unanimously.

The retiring director was re-elected.

Capt. SIMMON wished to be satisfied that the utmost work had been done in properly developing the property.

Mr. HAMMOND stated his belief, from personal knowledge of the company's property, that no tin mining property in Cornwall had been better or more economically managed in this respect, and that he considered great praise was due to Capt. Bennetts for opening up at so small a cost the fine champion lode known as the Black lode, which gave satisfactory prospects at the present level of not only paying expenses but returning good profits to the shareholders.

The retiring auditor, Mr. Norton Harper, was re-elected, and the proceedings terminated.

NEW CENTRAL SNAILBEACH MINING COMPANY.

The ordinary general meeting of shareholders was held at the London Tavern,—Mr. R. HILLHOUSE in the chair.

Mr. J. S. WAINWRIGHT (secretary) read the notice convening the meeting, and also the report of the directors, which was as follows:—

The works of the company since the last half-yearly meeting have continued regularly. The progress made and the present state of the company's mine and plant will be found in Capt. Kitto's report. In compliance with Capt. Kitto's recommendation, the works at Hogstow Hall have been suspended. The directors are impressed with the necessity and importance of sinking the engine-shaft at Mytton Dingle to a deeper level, but for this purpose additional capital must be provided. Of the 3000 preference shares created in June last 1006 remain on hand, and these must be at once subscribed for and issued if the works of the company are to be continued. On this point the directors can only repeat what they stated in their last report—that after so large an expenditure on the mines, and with so good a prospect of success, it will be most deplorable if the shareholders permit the undertaking to fail and pass into other hands for want of funds. They appeal to the large shareholders, who had up to this time taken none of the preference shares, to subscribe for their rateable proportion of them.

Mr. WAINWRIGHT then read the report of Capt. Kitto, explanatory of the position and prospects of the mine. The machinery at both mines is in perfect order; and Captain Parry, the resident agent, states that the 30 yard level at Mytton Dingle has further improved, and is now worth 4*l.* per fathom.

Mr. CLENCH said there was a lump sum in the accounts of 300*l.* paid for merchants' bills, and said he should like to know of what it was made up.

The CHAIRMAN said he would explain the nature of it, and it would show the great advantage which attended the system on which this mine was worked. There was no dispute with the workmen about the rate of wages. When an inspection of the mine was made a proper estimate was taken as to the best course of continuing the driving; the work was then set to the miners at so much per fathom, but in setting it there were certain items, as candles, explosives, and other articles, which the men did not purchase themselves, but which the company purchased and charged to them, and which really formed part and parcel of the expenses of driving.

Mr. CLENCH said there was another item with respect to which he should like an explanation, and that was the item of 10*l.* 10*s.* for mine survey.

The CHAIRMAN said it was paid to Capt. Eddy for the report which he furnished to the last meeting. The mine was likely at that time to turn out a very valuable property, but the directors not wishing that belief to rest entirely upon the opinion of themselves or Capt. Kitto, thought it desirable also to have the opinion of Capt. Eddy as an entirely independent judge, and accordingly Capt. Eddy carefully inspected the mine, and made a very full report, the charge for which appeared in the present accounts.

Mr. CLENCH asked how it was that two balance-sheets had been circulated, one of which differed in one or two minor points from the other?—The CHAIRMAN said it was easily explained. In the first balance-sheet one or two printers' errors had crept in, which were not observed till after they had been sent out; directly it was found that there were one or two errors the directors had them corrected, and sent out a corrected balance-sheet to each shareholder.

The CHAIRMAN, in the course of a few general remarks, mentioned that as the driving progressed it was found that the bottom ground was more rich than the upper.—Mr. WOODWARD: That is a very good characteristic.—The CHAIRMAN said undoubtedly it was. After referring to the mode in which the mine is being worked (which will be found detailed in Capt. Kitto's report, given above) he went on to say that the great difficulty with which the directors had had to grappel was the backwardness of the shareholders to come forward and take the preference shares. He certainly must confess his great disappointment at this, inasmuch a these preference shares had peculiar advantages—they had a priority over the other shares, and were safe. He then read a letter which had that morning been received from Capt. Parry, which was as follows:—"I am happy to inform you the lode in the end driving east at the Dingle has further improved since I wrote you on Monday, and is now yielding sufficient ore to pay for the driving—4*l.* per fathom." He might mention that some of the driving had cost 10*l.*, 12*l.*, or 14*l.*, when different ground had been met with. Capt. Parry went on to say—"There is lead ore all up the end, but the best is at the bottom. I have just broken some fine stones of solid lead up to 20 lbs. weight out of the bottom of the end, and as we must be nearing the dip of the ore ground there can be no doubt of its further improving as we proceed." He expressed his hope that the shareholders would, in their own interest, come forward and take the remainder of the preference shares, and again pointed out the advantages they possessed in having a fixed dividend, and also a lien upon the plant of the company, and were, therefore, perfectly secured. They had also another privilege—if the mine should become an extremely prosperous one (which he could not help thinking it would be to some parties one day) then the holders of these preference shares would have the right to exchange them for ordinary shares. In conclusion the Chairman moved that the report of the directors, Capt. Kitto's report, and the accounts as audited be received and adopted, and that a report of the proceedings be printed and sent to the shareholders.

The resolution was seconded by Mr. WOODWARD, and carried.

Mr. THOMPSON moved that Mr. Hillhouse, the retiring director, be re-elected. He said that Mr. Hillhouse had taken a very great deal of trouble to make the company a success, and had, moreover, done what a large number of the shareholders had not done—taken his proportion of the preference shares and a good many besides. (Hear, hear.)

The resolution was seconded by a SHAREHOLDER and carried.

The auditor was then re-appointed, and a vote of thanks having been given to the Chairman the meeting broke up.

THE BENSBERG LEAD MINING AND SMELTING COMPANY.

The annual general meeting of shareholders was held at the Law Association Rooms, Liverpool, on Wednesday, Lieut.-Col. WILSON, the chairman of the company, presiding. The report of the directors (which appeared in last week's Journal) having been read, the Chairman, previous to moving its adoption, said he should like to call the attention of the shareholders to the fact that at the time of the last meeting the carbonate seemed to have assayed only 22½ to 30 per cent., and now it was averaging about 40 per cent., and they had some as high as 70 per cent. The report of the directors having been taken as read, the CHAIRMAN moved its adoption. In doing so, he explained the reason of the non-completion of the machinery. He said the directors had done their best to push on the work, but had been prevented from completing it through the state of the labour market. The contractors were, however, under a penalty for not having completed it by Feb. 1, and notice had been given to them that the penalty would be enforced. Mr. Hoffman (the manager), in a report just received from him, said he hoped to have everything up by the end of next week. With regard to the working of the mine, he stated that they had gone very deep with the workings, and had uncovered more ground, and it would be very satisfactory to the shareholders to know that as far as they had explored they had found carbonate fully as rich or richer than before, and the indications led to the expectation of further discoveries. They might naturally conclude that they had got a very large and improving property, which he believed was at least double the value it was 13 or 14 months ago, owing to the extent of lead-bearing ground that had been uncovered. When they got their machinery the directors intended to work night and day until they got all the surface work done, and they would then be prepared, if they found it as prosperous as it now appeared, to double or even treble their machinery, for which they had provided sufficient space. He concluded by expressing his readiness to answer any questions that might be asked.

Mr. E. K. MUSPRATT having seconded the motion, Mr. GOFFEY said he should like to know what was the percentage and the salary allowed to Mr. Hoffman, and also under what circumstances the directors had appointed Mr. Pagan consulting engineer.—The CHAIRMAN explained that Mr. Hoffman had expected to be paid at the rate of 450*l.* a year, but the directors had arranged for a salary of 300*l.* and 1 per cent. on the net profit on the working of the mine. For this sum Mr. Hoffman devoted his whole time to the services of the company. As to Mr. Pagan's appointment, it was considered desirable to have someone with whom they could confer, and he had merely a small consulting fee. If he were sent to Bensberg he would probably receive 2*l.* 2*s.* a-day and his travelling expenses, which would, no doubt, be considered a small amount for a man in his position.

Mr. GOFFEY said he considered the explanation very satisfactory.

The report and statement of accounts were then passed, and the dividend of 6*s.* per share recommended in the report declared.

On the motion of the CHAIRMAN, seconded by Mr. J. B. SMITH, Mr. Robert H. Ashton was appointed a director in the room of Dr. Clerihew, it being stated that the new director was largely interested and having considerable interest in mining affairs. The Chairman, who was the retiring director, was re-elected, and Mr. A. W. Chalmers was re-appointed auditor.

Mr. THOMPSON (the secretary) then read the monthly report from Mr. Hoffman, the manager, which appears among the Mining Correspondence.

The shareholders then resolved themselves into a special meeting to consider the proposed modification of the 104th Article of Association in the form of the last paragraph of the directors' report.

The CHAIRMAN explained that the proposal was made to meet the requirements of the Stock Exchange Committee, who would not otherwise quote the shares of the company. He moved that the article be modified as recommended.

Mr. J. B. SMITH seconded this motion, which, after a short discussion, being supported by Mr. H. C. Drinkwater and other gentlemen, was agreed to.

The usual vote of thanks was then accorded to the Chairman, and the proceedings were closed.

WHEAL SETON MINING COMPANY.

A meeting of adventurers was held on the mine on Tuesday—

Capt. W. TEAGUE in the chair.

The usual preliminaries having been disposed of, the accounts were submitted, showing a loss of 1374*l.* 17*s.* 11*d.* on the two months' working, and a balance of liabilities over assets of 1379*l.* 12*s.* 6*d.*

The CHAIRMAN stated that all those in arrear of calls had been written to, and several sums had been received; but at the same time he thought it was necessary that immediate steps should be taken to recover the remainder of the calls, and he hoped that some gentleman would presently make a motion to that effect, for it was most desirable that they should get in the money, and if they took steps to enforce the payment of the calls through the County Court it would save a great deal of bother, and they would accomplish their object.

Mr. DAIBB suggested that the best they could do was to declare the shares forfeited unless the calls were paid after due notice.

The CHAIRMAN having read the report of the agents upon the various points of operation said he believed that the old lode became poor at or about the 110, or, at any rate, ceased to yield any profit. They now appeared to be on the south lode, just where the old lode began to be productive. He did not know whether they were going to have the same results in the south lode, but there was one thing that struck him, and that was that if they were going to mine at all they ought to select a district to mine in, and he thought it would be very difficult to find a better district than the one in which they were now situated, seeing the enormous returns that have been made both in this mine and in the mines to the west and south. Then, again, in the next place they should have two well-defined lodes, and looking at the district around them, and also at the lode—a parallel lode with those that have been so productive—he could not help thinking that this offers a very fair chance of success.

Mr. HINGSTON remarked that they must decide how to meet the deficit of 1347*l.*

The CHAIRMAN, in connection with this subject, would say a few words as to the northern part of the mine. He was convinced that for the present, at least, they should have nothing to do with the north part of the mine; and, seeing that the money which purchased the machinery and materials now in the north part of the mine came from the pockets of the adventurers, he did not see why they should not now dispose of those materials, in order to pay off the debit balance which stands against them. It was not for him to decide that question, but it had struck him that they might pass a resolution to the effect, "That the machinery and materials in the north part of the mine be offered for sale in one lot by tender, that tenders be invited forthwith, that the proceeds of such sale go to liquidate the present debit balance against the mine, and that no call be deemed necessary for the present."

The report and accounts were passed, and the Chairman's resolution adopted. The appointments of the new officers were confirmed.

The CHAIRMAN, in acknowledging the confirmation of his appointment, remarked that whether they made profits or lossess, he trusted they would always conduct their meetings with propriety, act as sober and sensible men, and give to their business that attention which it deserved. His own conviction was that Cornish mining was taking a different turn to what it used to do. They had had a lot of people taking part in Cornish mining who were non-residents in the county, but at the present time it was being carried on more locally, and he thought they would see beneficial results arising from it. He sincerely hoped that in the future Cornish mining would be conducted in such a manner that it would not be spoken so ill of as it had been in the past. He saw no reason why it should not be as legitimately pursued as any other business in which men could be engaged.

Mr. RULE said there were a great many remarks made out of doors respecting the stream works that were on the mine, and he should like to know whether they had any right to go down and sink a shaft there. Capt. Teague had recommended the sale of the machinery and materials in the north part of the mine; what did he propose to do with regard to the stream works?

The CHAIRMAN having explained that he proposed to sell not only the stream works, but everything which the lords would allow them to take away, the meeting separated.

EAST POOL MINING COMPANY.

A two-monthly meeting of adventurers was held on March 10 (Mr. R. R. BROAD, of Falmouth, in the chair), when the Chairman moved the adoption of the report and accounts, and also that a dividend of 2*s.* 6*d.* per share be declared; but one or two adventurers expressed as their opinion that as the mine was in debt it would be better to devote the profits of the two months' working towards the reduction of that debt rather than to the payment of a dividend.

The CHAIRMAN replied that the present position and future prospects of the mine were so good that the committee thought they were justified in recommending the payment of a 2*s.* 6*d.* dividend.

In answer to a question from a Shareholder, Capt. GARBY stated that there was at present owing on the suspense account, 2210*l.*; on the award to South Crofty, 700*l.*; that the labour cost was in arrear to the amount of about 1000*l.*; and that there was tin charged in their accounts that day to the extent of 490*l.* more than they had in the house. They had drawn it, but had not been able to return it on account of the water, which had covered the best part of their tin. Against this they had the Tehidy engine, which was worth 500*l.*, so that their net debts were about 3900*l.*

The CHAIRMAN: I only wish, for the interests of the county of Cornwall, that every mine within it was situated as well as we are. We have a good deal to contend with, not only on account of the water, but also on account of the increased price of materials. Coals are still standing at a very high figure, and there has been very little, if any, reduction in the price of iron. I, therefore, think that under all the circumstances we may flatter ourselves that we stand in a very good position, and I hope we shall very soon clear ourselves of all our liabilities.

Mr. VIVIAN pointed out that by appropriating their profits to the payment of dividends instead of reducing their liabilities they were continuing to incur bankers' charges.

Capt. GARDY asked whether there was a single mine in the county that had not bankers' charges?—Mr. VIVIAN said he had no doubt other mines were in the same position, but that did not make the system anything the better.

Another ADVENTURER remarked that the system of crediting ores which were not returned was a bad one, and ought never to have been commenced.

Capt. GARBY replied that they should have thought of that before. Adam never ought to have eaten the apple. (Laughter.)

Capt. HOSKING mentioned that 1200*l.* worth of copper ore had been sold which had not been charged in the present accounts. It would come in the next two months.—The motion was then put to the meeting, and carried.—*Western Morning News.*

WHEAL VINCENT MINING COMPANY.

A numerously attended meeting of shareholders was held at Callington, on March 7 (Mr. E. NICOLLS, the purser, in the chair). From the statement of accounts, it appeared that the cost of three months' working had amounted to 1891*l.* 14*s.* 11*d.* There had been received, for about 13½ tons of tin, 1011*l.* 19*s.* 1*d.*; for balance of calls, 376*l.* 5*s.* 2*d.*—leaving a debit balance of 503*l.* 10*s.* 3*d.* From the captain's report, it appeared that the mine was looking exceedingly well—in fact, improving in the deepest points. Considerable discussion took place about the past management, from which the mine had undoubtedly suffered, and it was generally admitted that about 3 tons of tin had been sold less than would otherwise had been sold had matters gone smoothly; however, all breaches were reported to be healed and everything going on well.

A report of Capt. Gifford, of Prince of Wales Mine, made on behalf of a shareholder, was read. In it Capt. Gifford says—"I have no hesitation in saying that I have not seen such a promising young mine for many years."

It was unanimously resolved to prosecute the mine with vigour, and to open up the ground in a thorough miner-like manner; for this purpose a call of 3*s.* 6*d.* per share was made. It is believed that when this mine is a little further opened, so as to send more stuff to the stamps, it will pay large profits. It was thought by all the shareholders present that, considering the short time (about eighteen months) since this mine was started, and that during this short time all the machinery, floors, &c., had been erected, and that about 28 tons of tin had already been sold, there was good reason to believe the property a very valuable one. Capt. Gifford was appointed manager, and the future of the mine is looked forward to with great interest in the district. The meeting terminated with a vote of thanks to the Chairman.

BROOKWOOD.—At a general meeting, on March 7 (Mr. T. K. Dymond in the chair), the accounts for 20 weeks, to Jan. 3, showed a profit of 808*l.* 13*s.* 4*d.*, and also a credit balance of 955*l.* 17*s.* 6*d.* A dividend of 800*l.* (4*s.* per share) was declared. Capt. Thos. Trevillion says—"The mine is in a sound and healthy state, and we hope by pushing on our two bottom levels to open up a mine capable of yielding for the future ore of equal value to what we have realised for the past year or two."

WHEAL MARY ANN.—At a general meeting on March 4 (Mr. W. G. Nettle in the chair), the accounts showed a profit of 1166*l.* 18*s.* 6*d.* A dividend of 204*l.* 16*s.* (4*s.* per share) was declared, and the balance of 962*l.* 2*s.* 6*d.* carried to the credit of next account. Capts. Joseph Harris, James Stevens, and James Skeat say—"You will perceive by the accounts furnished by the purser, that although we have made larger returns than usual, owing to the very high price of coals, iron, an extra month's cost, and other expenditure over which we have had no control, we have not been able to make more than sufficient profit to enable you to declare a 4*s.* dividend."

WHEAL DAMSEL.—At the meeting, on Tuesday, the accounts showed a debit balance of 184*l.* 0*s.* 7*d.* Capts. James and Whitburn reported upon the various points of operation. The water has been excessively heavy, and they have been disappointed in their hopes of immediate success. It was resolved to offer the mine for sale as a going concern, and the confirmation, or otherwise, of the resolution is fixed for March 27.

GUNNISLAKE.—At a general meeting held at the mine, on Wednesday, the accounts presented for the 20 weeks to Jan. 11 showed the expenditure to have been 2962*l.* 17*s.* 11*d.*, and the receipts, with a balance of 655*l.* 18*s.* 6*d.* from last account, 2253*l.* 9*s.* 5*d.*, leaving a debit balance of 709*l.* 8*s.* 6*d.* To meet this deficiency, together with the requirements for the ensuing four months, a call of 3*s.* per share was made, payable forthwith. Although the ends driving in the mine at present are not looking so well, a good course of ore has been met with in the shaft sinking below the 152, which from the improved character of the lode, both in size and quality, promises a good mine in depth.

MOUNT DALBY.—At the first annual meeting of shareholder, at Manchester, on March 7 (Mr. J. H. Lane in the chair), the report of Capt. Woolcock and statements of accounts were submitted. The Chairman stated that proofs of the unbounded richness of the property have been obtained, and that specimens of silver-lead ore of great richness, taken from an adit during the previous week, were on the table. Machinery is now required for carrying on the workings with success. Although the balance was now against them, they anticipated that with the forbearance of the vendors and the subscriptions by the proprietary for additional shares they would be placed in a good position. The report and accounts were received and adopted: Messrs. J. Armstrong, S. Bottomley, S. Astle, J. Beresford, P. Grant, and W. Armstrong were appointed directors, and Messrs. Nicholson and Milne auditors. The proceedings terminated with the usual complimentary votes.

OHIO CROWN.—At the meeting of shareholders at Douglas (Mr. D. D. Lewin in the chair), the directors stated in the report which they submitted that they were in daily expectation of meeting with the junction of the two lodes in the 70 fathom level, which point is being looked forward to with great interest, having produced at the junctions of these lodes in the upper levels considerable quantities of silver-lead ore. The manager (Capt. Edw. Bawden, jun.) reported that to effectually work the mine the engine-shaft should be at once proceeded with and sunk for a deeper level, as they are now apparently skimming over a new and improved section of ground underlying the 70 fathom level, and evidently depth only is required to bring the mine to a successful issue. The whole of the machinery on the mine is in thorough repair and working well. The balance of assets over liabilities was 1419*l.* 17*s.* 7*d.* It was agreed to leave the management entirely under the hands of the directors, and it was suggested that (as had been recommended by Capt. Rowe) the 70 fathom level should be extended further to the east. Mr. Adams said that in order to make the expense on the company as light as possible he would give his services in London gratuitously.

[For remainder of Meetings see to-day's Supplement.]

THE COPPER TRADE.

A very large trade has been done in the past month; the smelters purchased considerable quantities of ores and regulus. Home consumers were also large buyers, and a good business was done for France, as well as export generally. The enormous stock, however, has not been sensibly relieved with this increased trade, and prices in consequence remain very much as they were. If all the circumstances surrounding the copper trade were now identical with the corresponding period of 1871, it could be argued from statistics that the price was still 10*l.* to 15*l.* per ton too dear; but these circumstances cannot be said to be quite identical. We have certainly attracted here by our price the stocks of nearly all the world, and thus have a stock identical with March, 1871, whilst at the same time our prices have so alarmed all our customers that they prefer to purchase almost daily in small quantities than allow themselves to be caught, as they argue, with stock at the top of the market; this explains the true meaning of our large supply, and is applicable to France, to Germany, to Russia, and to our new customer, America, and especially to our home trade also, whether smelters or manufacturers; and whilst our customers choose to act with this wisdom and caution there is no reason to anticipate much change in the position of the market. The speculative holders, moreover—unfortunately for them—have come to the conclusion that the market, left to itself, must advance sooner or later to some fabulous price, forgetting that as we at present have the world's stock here, they have the power through their large holding, if used with discretion, of now ruling the price, which they completely failed to do last year whilst the world was sending us unlimited supplies. A better demand has arisen from India, and our general exports are 1000 tons more for the first month of the year than in 1872, whilst our imports for that month are nearly 4000 tons less than in 1872; but those items have no effect against the stocks, which at present alone form the index in buyers' minds. The charters from Chili for January were 3500 tons. The latest mail advices show the shipments for 1872 to be somewhat different to that last reported. They are stated as 46,752 tons actual shipments for the year 1872, being an increase of 6003 tons over 1871, leaving a stock of 4000 tons as against 10,000 tons January 1, 1872. The stock of Australian here has very largely increased, and is now close upon 8000 tons, and the quantity afloat to England is nearly 2000 tons more.

The imports of copper into England for the first month of the following years were:—1870, 2434 tons; 1871, 4934; 1872, 8365; 1873, 4720. The exports for the same periods were:—1870, 4780; 1871, 1331; 1872, 3071; 1873, 4076. The position from March 1, 1872, to March 1, 1873, was as follows:—

	Price.	Stock on hand.	Stock, including afloat and chartered.
1872—March 1	£88 0 0	.....Tons 20,047	.....Tons 29,647
April 1	97 0 0	19,507	30,907
May 1	101 0 0	21,435	34,295
June 1	107 0 0	21,595	35,495
July 1	104 0 0	23,213	37,447
Aug. 1	103 0 0	27,733	39,733
Sept. 1	90 0 0	27,922	39,989
Oct. 1	84 0 0	29,342	41,409
Nov. 1	86 0 0	28,940	40,051
Dec. 1	85 0 0	30,753	40,453
1873—Jan. 1	90 0 0	32,001	41,991
Feb. 1	87 0 0	32,432	42,012
March 1	85 0 0	32,180	41,663

And the comparative positions at the same date of the past four years with the present are as follows:—

	Price.	Stock.	Stock, including afloat and chartered.
1869—March 1	£72 0 0	.....Tons 21,354	.....Tons 37,228
1870—March 1	67 0 0	30,605	45,276
1871—March 1	66 0 0	33,502	42,531
1872—March 1	88 0 0	29,047	29,647
1873—March 1	85 0 0	32,180	41,663

HENRY ROGERS, SONS, AND CO.

SOUTH ROMAN GRAVELS.—Of all properties attracting the attention of speculators few claim greater notice than this. It appears really not a question of searching for lead ore in this enterprise, but rather two questions arise—1. In what time will the Shelvefield engine-shaft, now being sunk on the north part of the lode, be able to intersect it?—2. When will the deep adit cross-cut west, driven towards the Roman lode, be able to cut it? To the first question a reply may be very easily given. On Jan. 29 only 9 feet were required to be sunk; and, further, that six men instead of four were engaged in rapidly sinking the shaft; also, that the lode was anticipated to be cut in a month from that date. It is known that the ground will then improve for sinking, and it is expected to be cut rich once more, several loose lumps of solid lead having been already taken out of the cavity in the west end of the shaft; moreover, up to the present time it has yielded 1½ tons of lead ore per fathom. The falling off since is reported by Capt. Powning to be, in his judgment, only temporary. In relation to the second

question, the driving of the deep cross-cut west towards Roman lode, is making good progress; the same may be intersected any hour, the ground being most favourable for progress; the excitement in Shropshire being intense at this period of the mines existence, no less than 90 fms. having been driven from the shaft in that direction. Much interest will also remain for future speculation, noticing the enormous value of her neighbours, Tankerville and Roman Gravels Mines, more especially the latter property. A few days, it is anticipated, will work marvellous changes in the position of this mine, seeing that the cross-cut towards Roman Gravels vein is in blue slate of the most favourable kind in the district, indicating the proximity of lead ore, the report circulated that the same was in the shale being obviously an attempt to depreciate this fine speculation.

ROCKS AND GOONBARROW MINES.

March 3.—I beg to hand you my special report on these mines, with my suggestions for their future working. The sett is about 1½ miles long and ⅓ of a mile broad. It is very well situated, about four miles from St. Austell, being crossed by the turnpike road from that town to Bodmin, by a good parish road, and by the railway to Par Harbour, which is now being extended to Fowey. It is also bounded on the west by the turnpike road from St. Austell to Roche. It is traversed in its longest direction by no fewer than ten east and west tin lodes, most of which have been worked upon extensively on their backs or outcrop, and several to depths of from 40 to 60 fms. for a portion of their length. Reckoning from the southward, these lodes are known as Rawson's, Fleddry, Webbs, South, Rocks, Paul's, Goonbarrow (two) and two newly-discovered lodes. There are also several caunter lodes, and at least one cross-course, which have yielded considerable quantities of tin near their junctions with the main lodes. The lodes which have been worked upon below the water level to any considerable extent are Webb's and Rocks lodes, about the centre of the sett, and the two Goonbarrow lodes in their western portions. These workings are known to have been productive, and in some portions were exceedingly rich. At present work is carried on at two points only—in a large open quarry in Rock Hill, at the junction of one of the caunter lodes already mentioned, with a tinny cross-course, and in a pit on the back of Webb's lode in the eastern part of the sett. From reports of some old men in the neighbourhood we were some time since induced to sink a pit on the back of the Fleddry lode, from which we raised many good stones of tin. We have also sunk a shaft some 13 fms. deep in front of our dressing floor, between the Goonbarrow lodes and Paul's lode, from which a good supply of water is available for dressing operations. I should now propose to extend our operations as follows:—1. To open out a new tin pit in Rock Hill, south of the present pit, on the Great Rocks lode, and east of the cross-course which now intersects our pit. We may fairly expect here a rich bunch of tin in addition to any quantity of stuff of fair average produce.—2. To cross-cut from the new shaft northward with the Goonbarrow lodes, and southward to Paul's and Rocks lode, cutting the Goonbarrow lodes east and the others west of the old workings.—3. To sink a shaft some 20 fms. north of our pit at Fleddry to a depth of 20 fms., and to cross-cut south into the Fleddry lode, and north in Webb's, South, and Rocks lodes.—4. To erect an engine for pumping, winding, and stamping, and to lay out dressing-floors near the shaft just mentioned, so as to dress the ores raised on the spot. The stamps for this purpose are already on the mine ready for erection.—5. To work a bed of excellent china clay which has lately been discovered in Rock Hill, south of the present and proposed quarry. These are by no means all the works which might be started with advantage, but they are such as can be got into operation in a short time and at a moderate cost. There is on the mine already one 30-in. stamping and pumping engine, of power sufficient to stamp from 70 to 100 tons of stuff per day; one portable engine, and Blake's stone breaker, capable of breaking at least 100 tons of stuff per day to a size small enough to go to the stamps. Trams, tram-wagons, dressing appliances, &c., sufficient to deal with 60 tons per day at the least, besides all buildings, offices, and tools necessary for the work of the mine.

I estimate the cost of the additional works proposed as follows:—Shafts and cross-cuts, and opening the new quarry, 1200*l*.; machinery, tramways, &c., 1500*l*.; buildings and dressing floors, 700*l*.; sundries, 600*l*.; total, 4000*l*. From the different points suggested there would be no difficulty in getting 150 tons of stuff per day—50 tons from the open workings, and 90 tons from the underground workings. From the 60 tons we may fairly expect to get an average daily produce of 5 cwts. of tin, or 6 tons of tin per month. From the underground workings I do not think we are likely to have an average produce of less than 1 per cent., which for 90 tons daily is over 20 tons per month, and this at present rates will sell for 2250*l*. A liberal estimate of total cost will be 1500*l*. per month, and this will leave a profit of 750*l*. per month. To this must be added the profit of the china clay, which can hardly be put at less than 100*l*. per month, making the gross profits on this very moderate calculation considerably over 10,000*l*. per annum. There can be no certainties in mining, but these estimates of production are so very moderate that the probability of their being exceeded is much greater than that of their not being realised. J. H. COLLINS, F.G.S.

Bugle, St. Austell.

March 10.—I have inspected this mining property on several occasions, and again a few days since, and beg to send you the following report thereon:—The sett is very extensive, embracing the two mines formerly known as Rocks and Treverbyn and Goonbarrow, and being altogether nearly 1½ mile long on the course of the lodes and about 300 fms. wide. Both these mines have been partially worked by former companies. From a report of my late father (Capt. Chas. Thomas), dated Jan. 10, 1850, I find that Rocks and Treverbyn Mine was then sunk to the 50, and that a large lode had been worked on at various levels for about 250 fms. in length. He reported it in some places to be from 12 to 20 ft. in width, rather increasing in value downwards, and calculated that for the ensuing 12 months 15 tons of tin per month could be raised, at 58*l*. per ton, at a cost of 1000*l*. per month, thus leaving 200*l*. per month profit. He also advised that the mine be sunk deeper, and remarks—"There are indications, and a fair probability, that the lode at greater depth will be found to increase in productiveness." I understand that the engine-shaft was afterwards sunk to the 60, but that very little was done at that point, and that the mine was suspended about the end of 1854. I have but little knowledge of Goonbarrow Mine when formerly worked, but am informed that a considerable quantity of tin was raised therefrom, some of which was very rich. The present proprietors of the mine have principally been working on a large lode in the side of the hill in the western part of the sett, from which a large quantity of tin is said to have been raised a few years since near the surface. A large quantity of overburthen has been removed in order to lay open the lode for stoping, and a level has also been driven into the hill about 10 fms. below the old workings. The lode in this part, though somewhat irregular in its formation, is very large, being from 6 to 8 fms. in width, and contains tin throughout, although some parts of it are much better than others. I have had various samples of the lode assayed at different times, and find that every part of it contains a little tin—a stone of the most unfavourable kind, and of a somewhat granitic character, having produced 5½ lbs. of tin ore per ton, whilst selected stones produced upwards of 2 cwts. of tin ore per ton. Other samples produced 10, 11, and 14 lbs. of tin ore per ton, and on comparing the sales of tin from the upper workings with the quantity of ground removed, I found that it must have produced on an average upwards of 11 lbs. of tin per ton, worth at the present price of tin (about 58*l*. per ton) 8*s*. 6*d*. per ton of stuff. If worked extensively, and on economical principles, fair profits ought to be made from stuff of this quality. By careful selection and judicious working I think it probable that a large quantity of stuff of similar value can be obtained. Further west, and about 100 fms. to the south of the lode formerly worked on in Rocks Mine to the drabove referred to, a lode called Fleddry lode has recently been opened on a little near the surface, and has produced some very rich stones of tin, and appears as far as seen to be of a very promising character. There are said to be two other lodes between this and Rocks lode, but very little can be seen of them at present, nor can much be done on them by way of trial without machinery for pumping water. Looking at their position, however, as well as at the character of the stuff broken from them near the surface, I cannot but think that they are well worthy of a trial, and are likely to be found productive. A little to the west of the large workings in the side of the hill above mentioned a shaft is sunk 8 fms. through a good bed of china clay, which from its position can be very cheaply worked, and almost certainly to a good profit. Its extent, however, is not yet ascertained. There is a good stamping-engine of 30-in. cylinder on the mine, working 48 heads of stamps, and an axle for driving 12 heads more is on the ground ready to be fixed, all in good condition for working. There are, also, dressing-floors in front of the stamps to which some additions, when necessary, can be easily made. There is, besides, one of Blake's stone-breakers, worked by a separate steam-engine, by which the tin-stuff can be broken into small pieces for the stamps much cheaper than by hand labour. On looking at all the circumstances in connection with the mine I consider it to a fair speculation. The best plan, in the first instance, would probably be to erect a portable engine for working a trial of the Fleddry and other lodes, so as to ascertain the best position for sinking a shaft and erecting a permanent engine for their future development. At the same time the workings on the large lode on the side of the hill can be proceeded with, as well as the preparing the china clay for the market. JOSIAH THOMAS.

Dolcoath Mine, Camborne, March 10.

MINING IN COLORADO—THE SILVER PLUME.—This well-known lode, situated on Republican Mountain, was discovered in 1868, and in July, 1871, passed into the possession of the Silver Plume Mining Company (Limited), organised in England. This company also own the Silver Star and Hickman lodes, on the same mountain. The property was purchased on exceedingly favourable terms, as only a small part of its price was paid in cash, while the remainder is to be taken from a portion of the net earnings of the mine. The company have a Government title to the Silver Plume and Silver Star. Most of the work has been done thus far on the former, which is so favourably located that drifts can be run on the vein from the surface. The first, or upper level, is 568 ft. long. Some stoping has been done above it, and most of the ore produced has come from this point. The second level is 400 ft. in length, and a shaft sunk at its entrance 60 ft. deep. This shaft will connect with the third level now 295 ft. long. A small amount of stoping has also been done over this drift. Between the third and fourth levels the so-called High Grade lode was worked by other parties, but it was soon proved to be on the Plume, and was given up by its claimants. A cross-cut tunnel, 135 ft. long, cuts the vein about 100 ft. below the third level, from which a drift has been driven east to the surface 137 ft., and westerly 250 ft. A shaft is being sunk from this last drift. The aggregate length of the levels is 1000 ft., and the horizontal distance from the east end of the first level to the entrance of the fourth is 1110 ft. It is the intention of the company to cut the vein still lower by a tunnel, from which they will drift east, so that when the end of their property is reached a depth of 800 ft. will have been attained. As yet the work accomplished has been done for the purpose of developing the vein, and preparing it for extensive working. The various levels will be connected by winzes, and a large amount of stoping ground thus exposed. During 1872 some 70 tons of ore were sold, averaging about 400 ozs. per ton, though some yielded over 1000 ozs. When it is considered how little stoping has been done, and that most of the work thus far is comparatively near the surface where the vein is often shattered and broken up, the yields speaks well for the future production of the mine. Wherever the wall rocks have been well defined the ore vein has proved nearly continuous, and of good width. The crevice is from 4 to 7 ft. wide. The ore is for the most part a sulphuret, with decomposed galena, but as depth is gained the latter ore, in an undecomposed state, increases in quantity. At present 14 men are employed on the third and fourth levels, and good ore is being taken out. A wagon-road is to be made to the mine during the coming summer, which will greatly cheapen the cost in transporting ore and supplies, which is now done entirely by "jacks." There are few mines in the district which have been opened for a greater length, and none which show a more continuous vein. There is little doubt when the devil work remaining to be done is accomplished but that this mine will be very productive. The owners have every reason to be satisfied with their investment thus far, and can safely expect to be amply remunerated in the future. Their working capital, like those of many other companies, was too small at the outset. It is a mistaken idea that a mine will pay from the grass roots. Some few may, but the vast majority need to be thoroughly developed before dividends can be expected, and this requires capital and time. It is currently reported that the company will soon enlarge their mill near the town of Silver Plume, and set up four Bruckner cylinders, &c., to reduce their own and custom ores. If this plan is carried out it will be of great benefit to the district, as well as to the Silver Plume Mining Company. The property at present is under the superintendence of Mr. Thomas Orchard, one of the directors of the company, who is doing his work well and thoroughly.—*Mining Review* (Colorado).

FOREIGN MINES.

CAPE COPPER.—The directors have declared a dividend of 25*s*. per share, free of income tax, payable on the 25th inst.

ST. JOHN DEL REY.—Morro Velho, Feb. 1: Sinking of shafts for January: Shaft A, sunk 3 fms. 3 ft. 11 in.: total depth, 146 fms. 1 ft. 1 in.; shaft B, sunk 3 fms. 5 ft.: total depth, 144 fms. 2 ft. 3 in. The sump of B is at present in a little more favourable ground.

RICHMOND CONSOLIDATED.—Cable telegram from the mine, Eureka, Nevada:—"Important discovery within Richmond lines, ore extended southerly; very rich. Start furnaces next week."

BIRDSEYE CREEK (Gold).—G. S. Powers: Telegram: We have cleaned up Uncle Sam, Brown's Hill, and Neece and West, after a run of 30 days. The gross returns are $9000; the profit is $6500. I send you a remittance of $5000. The tunnel and shaft cost is $600.

ALMADA AND TIRITO.—Telegram from Mr. Clemes:—January profit for month $7960, equal to 1592*l*. sterling. Profit for month, after deducting London expenses, 1466*l*.

HUDSON (Gold).—S. O. Brown, Feb. 8: It affords me great pleasure to report very rapid progress in sinking, 12 ft. in depth having been attained to-night. This rapid work in sinking was quite unexpected by all concerned, but the rock has been remarkably favourable heretofore, but from present indications the depth made next week will be much less. At present writing the vein is 7 ft. wide, including gouge 18 in., and we leave nearly 2 ft. on the hanging wall. The quartz has undergone a radical change the while, flinty rock being replaced by a more porous bluish rock. This is regarded as a most important change, and is indicative of richer ore ahead. Taken altogether the appearances are decidedly encouraging.

GOLD RUN.—O. S. Kipp, Feb. 16: The hydraulic was started on Jan. 16, but up to this day have used only 12 days' water. There are two reasons for this waste of time—a break in the ditch detained us a few days, after which came on a heavy snow-storm and extremely cold weather. I have flooded the flume, and stopped work until the weather moderates; it is warmer to-day, and if it continues favourable for a few days I will start again. Now, in relation to the sinking of the shaft my judgment was put to the test, and as I desired no failure I called to my assistance other good miners who were conversant with the blue lead channel, who placed the proper location for sinking the shaft in the immediate vicinity of where we are now washing; therefore, I consider it was good policy to wait until we washed away the dirt (60 ft. bank) with the hydraulic, which we have now done, and past the line, where we are now rigged for sinking the shaft. I have rigged up cheaply but substantially, and shall break ground in the morning. The size of the shaft will be 4 by 7½ (perpendicular). I shall commence with two 12-hour shifts, two men to the shift. I have got a good crew of men, my foreman being an old shafter. I shall push the work with all vigour possible, and I feel confident that we shall develope a very rich mine; certainly we have very flattering prospects ahead. I shall prospect dirt at every 10-ft. station, and report the same to you. I hope soon to report to you of a good clean-up, and of favourable workings and prospects in the shaft.

BATTLE MOUNTAIN.—Capt. Richards, Feb. 20: Virgin: The 145 ft. level, north of Daniel's winze, is producing some good ore; the lode is not large, but the ore is rich. The stope in back of the 145 ft. level is yielding fairly. The 113 ft. level being driven north is again poor, yielding no ore, but it has a very regular west or hanging wall. Peirce's stope in back of the 113 ft. level continues to yield a little ore. Hooper's rise in back of the 73 ft. level is now poor, but has produced a small bunch of ore during the past week. Jack's stope produces good ore. Pascoe's stope, also, back of the 73 ft. level, yields a fair amount of carbonate of copper. I hope in the course of two months to be able to open the stopes in the back of the 113 and 73 ft. levels further north than any of our present stopes, when I expect the ore raising will be increased. Further developments, however, have first to be made by a winze or rise between these two levels, probably two; and also Hooper's rise must be holed to the surface, which will give good ventilation. Ore shipped, 2542 sacks; waiting shipment, 3351: total, 5893.

SNOWDRIFT (Silver).—We understand that the directors have received a most important letter from Mr. Peters, of Trenton, New Jersey, on the 13th inst., mentioning that he had bought up the entire shares belonging as vendors to the Trenton Gold and Silver Mining Company, which they received in part payment of the sum paid for the property. In addition Mr. Peters has taken up a fair proportion of the debenture bonds lately offered by the company to its present proprietary, which, out of the 10,000*l*. authorised by the general meeting, has been completed up to 6000*l*. Moreover, that Mr. Peters has bought, on his own account, an additional quantity of land in connection with the "Daniel Peter's lode" (named after himself), and that he intends to spend the ensuing summer in Georgetown, Colorado, for the purpose of developing the lode beyond the boundary belonging to the Snowdrift Company. This act of Mr. Peters, at such a time, must be peculiarly gratifying to the directors, considering that he was a large shareholder in the Trenton Gold and Silver Mining Company, and that it marks his appreciation of the property (being an American gentleman), as well as the confidence he has in the London management, to thus associate himself with the company.

MONTE ALBO.—March 2: Su Ergiolu: We resumed the driving in the No. 7 level, south from new shaft, by three men two days ago; the lode as far as seen is 1 m. 20 c. wide, and will yield for size of level ¼ ton of ore per metre, but we have not yet made sufficient progress to ascertain the real value of the lode here. Nos. 1, 2, and 3 stopes in back of No. 6 level, south from new shaft, will yield ⅓ ton of ore per metre each. Nos. 2 and 3 stopes in back of No. 5 level, south of new shaft, will each yield ¼ ton of ore per metre. We have commenced to drive a cross-cut east in the No. 4 level, south from new shaft, to intersect the eastern part of the lode. I hope to be able to drive on No. 5 level, south from new shaft, soon, as we shall require some poor stuff to fill our stopes. In Julius Cæsar cross-cut we intersected last week a cross lode, which I think from its bearing is the Santa Anna lode. This lode crosses the Lucifer lode at a distance of 40 metres from the point of intersection, judging from the underlie of the Lucifer lode.—Napoleoni: A stope in the back of No. 1 level, under the Napoleoni level, west of winze, will yield ¼ ton of ore per metre. A stope in the back of the Galleria Nuovo will yield ¼ ton of ore per metre.

PESTARENA UNITED (Gold).—We are at present working night and day placing the buckets; half of them are in, and the other half will be in the wheel before Sunday morning. No time will be lost next week in laying the sole boards to the wheel. We hope to finish the wheel, make the change in launder at the head of same, and commence amalgamating with ten mills about the latter part of next week. The cutting of rock at the head of water-course to receive the new shop gate is drawing nigh completion. Good progress is made in the drive behind establishment to the ore pass, and also on the wall, to further secure the mountain over the drive.—Val Toppa Mine: We have put on several more men, and have completed the repairs to the tramroad throughout the whole length of the No. 3 level. We are now repairing the tramways in No. 2 and No. 4 levels. No. 2 level will be finished some time next week, when we shall resume driving some of the ends on discoveries.

WEST CANADA.—Feb. 8: Huron Copper Bay: The stope in the back of the 60, east of Bray's shaft, will yield 2 tons of copper ore per fathom. The stope in the bottom of the 35, west of Palmer's shaft, will yield 3½ tons of ore per fathom. In the bottom of the 35, east of Bray's shaft, the stope is yielding 3 tons of ore per fathom.

LUSITANIAN.—March 4: Palhal: The shaftmen in Taylor's engine-shaft have completed the plat in the 160, and are now preparing to put in a plunger in this level.—Levels on Basto's Lode: The 160, east of Taylor's, is idle for the present, and the men are rising against No. 94 winze; in this rise the lode is composed of quartz and ore, of which latter it yields 1½ ton per fathom. We have also suspended the 150, west of Taylor's, and put the men to rise in the back of the level against No. 93 winze, where the lode is worth 2½ tons per fathom. The 150, west of Taylor's, has reached the slide lode, and is now stopped. In the 150 east the lode is producing 1½ ton per fathom. In the 130, east of River shaft, the lode is 2½ ft. wide, composed of quartz. In the 120, east of River shaft, the lode is 3 feet wide, composed of quartz and country; and in the same level west the lode is 5 feet wide, unproductive. In the 90 east the lode is 1½ foot wide, composed of schisto and country, with a string of ore. The lode in the 80 east is 3 ft. wide, worth 1¾ ton per fathom. The lode is small in the 70 east, but appears to be improving. The branch in the 38, west of slide lode, is worth ½ ton of ore per fathom. The Mill lode in the 18, east of Taylor's, is worth 1 ton per fathom; and in the 32, west of slide lode, is 6 in. wide, very regular, and composed of flookan.—Slide Lode: In the 140, south-west of Taylor's, the lode is 2 ft. wide, of flookan and schist. In the 130, east of slide lode, the lode is very regular, with good walls, but no ore. In the 130, north-east of Taylor's, the lode is 1½ ft. wide, composed of flookan and schist. The ground is hard and without change in the adit cross-cut, west of Perez' shaft.—Winzes on Basto's Lode: In No. 92 winze, below the 70, east of River shaft, the lode is worth 1 ton per fathom. No. 93 winze, below the 150, west of Taylor's, is going down in a lode yielding 2 tons per fathom. The lode in No. 94 winze, in bottom of the 150, east of Taylor's, is composed of quartz. In the rise above the 110, east of River shaft, against No. 86 winze, the lode is 4 feet wide, composed of quartz and country, with a little mundic.—Carvalhal: The 60 cross-cut, north of incline shaft, is now suspended. The great lode in the 40, east of incline shaft, is 2 feet wide, composed of quartz, country, and mundic. The flookan lode in the adit, west of incline shaft, is 1 ft. wide, of soft flookan.

BENSBERG (Lead Mining and Smelting).—Manager's Monthly Report for February: The water still being too abundant on the bottom floor, we continued working on the upper floors of the open-cast, where we struck a vein of carbonate running east and west, and dipping to the north. The carbonate was overlaid, as in former cases, by rich wash-ore. In order to ascertain how far this wash ore extended beyond our open-cast, we drove a level from this to the north, about 30 ft. from surface, which is now 18 ft. long, producing wash-ore throughout. At the extremity of the roof of the level, however, it becomes less rich, whilst on the floor it continues of the same quality as before, which is explicable by the entire deposit dipping in that direction. Were we in a position to drive a level at a greater depth we should undoubtedly find that the ore extended far beyond the present ascertained limits. A level was also driven to the south, but being too near surface to lead to satisfactory results was stopped, after being driven 30 ft., until such time when we can pursue it at a greater depth. At the west end we commenced removing the sand from the vein of carbonate, and got into small tributary veins, at 10 to 12 ft. deep. There are still 12 ft. of sand to remove before we strike the main vein at its highest point, and which will probably occupy the whole of next month to do. The pit-frame (33 ft. high) was put up, and preparations made for lowering the steam-pump further down the shaft in order to resume sinking, which, as the wet season is now nearly over, may be done without risk. The steam-engine and boiler for driving the dressing machinery are now completely mounted and ready for working; the shaft connecting the engine with the dressing-house is also fixed. The greater part of the dressing machinery has been delivered; I enclose a list of the pieces still wanting; of these the shafting is the principal part, as this must be laid before the other machinery can be put into position. The machinists are busy at work with the remainder, and expect to complete next week. The delay is owing to difficulties having occurred with their workmen. We invoiced for January 105 tons of carbonate, average assay 40 per cent.; and delivered for February 110 tons, averaging 40 per cent. assay, which will be assayed again at Stolberg. We have now 100 tons of ore in stock ready for delivery. Besides the carbonate, we got 140 tons of rock ore, which contains about 10 per cent. of metal, and 50 tons of wash ore, containing 15 per cent. of metal. This we stored for future dressing with our machinery.

FORTUNA.—Feb. 26: Canada Incosa: The lode in the 110, west of Henty's shaft, is still divided into two parts, but more open than it was, and letting out more water; the lode is worth ½ ton per fathom. The 100, west of Judd's shaft, is communicated with Ciro's winze; the lode is small at present, yielding ¾ ton of ore per fathom. The lode in the 80, east of Henty's cross-cut, is small and of no value. The lode in the 50, west of San Pedro shaft, is a strong lode, and composed of quartz spotted with lead ore, yielding ½ ton of ore per fathom. In the 60, west of San Pedro shaft, the lode is still large, but not so rich for lead as it was, producing ½ ton of ore per fathom. The lode in the 60, east of San Pedro shaft, is a very promising lode, composed of spar, clay, and lead ore, yielding 1½ ton of ore per fathom. The lode is small and poor in the 90, east of Addis's shaft. No change since last report in the 80, west of Lownde's shaft. The 90, west of Lownde's shaft, is suspended, and the men put to cut plat and barrow-road in the 90; the lode is worth ½ ton per fathom. The lode in the 90, east of Lowndes shaft, is smaller, and of less value than it was, yielding ¾ ton of ore per fathom. The ground in the 80, east of Caro's shaft, is hard for driving, and the men making but little progress; the lode is producing 1 ton of ore per fathom.—Shafts sunk: Mr. Kennedy's shaft, sinking below the 70, is communicated with the 80; the lode is worth 1 ton of ore per fathom. The men are making fair progress in San Pedro shaft below the 30. We expect to hole Jorge's winze, sinking below the 50 to the 60 in a few days, the lode is worth 1 ton per fathom. The lode in Puentos winze, below the 100, is small, and of no value.—Los Salidos Mine: A great improvement has taken place in the 110, west of Buenos Amigos shaft, during the last few days, yielding 3 tons of ore per fathom. The 100, west of San Carlos shaft, is in a strong cross-course, which has cut off the lode. The lode in the 90, west of San Carlos shaft, is small, and the ground hard. There is a good stone of lead in the bottom part of the 110, east of Morris's engine-shaft, yielding ½ ton of ore per fathom. The lode in the 100, east of San Pablos shaft, is small, and the ground hard at present, but we hope it will improve shortly. There is nothing new to notice in the 90, east of San Miguel's shaft. The lode in the 35, west of Palgrave's engine-shaft, is small, and letting out a large quantity of water; we expect it will improve shortly. In the 35, east of Palgrave's engine-shaft, the lode is small and quite valueless, and the ground hard.—Shafts and Winzes: The lode in Morris's engine-shaft, sinking below the 110, although poor at present, is strong and kindly, and has a promising appearance. In Palgrave's engine shaft, sinking below the 35, the lode is large, composed of gossan, clay, and lead ore, yielding of the latter 2 tons per fathom. The lode in San Miguel's shaft, below the 90, is split up into small branches. We have commenced the sinking of San Carlos shaft below the 100, and shall get it down as fast as possible; the lode is worth 1½ ton per fathom. The lode in Julian's winze, below the 100, is small, and the ground hard for sinking. Roman's winze, sinking below the 90, is going down in a very fine lode, composed of quartz, clay, and lead ore, yielding of the latter 3 tons per fathom.

LANESTOSA.—Feb. 27: Santa Lucia: In driving west from the [illegible] the end continues in hard dolomite, the orey ground rising faster than level, but now intended to suspend driving, and rise after the ore.—Asunción: The [illegible] of explanatory shaft cannot be worked, through much water from melted snow, the lode yields 1 ton of lead per fathom. In driving north from No. 2 [illegible] men from the shaft have been working here, and have cross-cut to No. 2 [illegible] shows strings of lead, but we are not through it yet.—Glanrafon: In sinking [illegible] de Uso shaft the snow-water is giving down; it still prevents work. In driving [illegible] adit cross-cut to the main lode the end is in hard dark limestone, and is progressing slowly.—Aurora: In driving the cross-cut east at bottom of Pardo's shaft, we are cutting through what appears to be the east lode; it has a very kindly appearance, iron-stained vesicular calcareous spar, with strings of lead.—La Flora: In cross-cut deep adit the end has touched the east wall; the lode continues hard and unproductive. In sinking winze from deep adit we are going down under the footwall lode. The latter appears to be much broken up and disordered; it will be cut [illegible] at bottom when safe.—La Luisa: In sinking winze from Ventura adit there is no change, except that the slides of dolomite are now being found on the footwall. Owing to the points producing ore not being worked, through the heavy snow [illegible] nothing has been raised.

LINARES.—Feb. 26: The lode in the 85, west of Crosby's shaft, is small, and the granite very hard. There is no improvement in the 75, west of Crosby's shaft. The 75, west of San Francisco shaft, has passed through some disordered ground, which injured the lode, but it is again improving, now producing 2 tons of ore per fathom. The lode is small at present in the 75, east of San Francisco shaft, yielding ½ ton of ore per fathom. The granite is a little easier for driving, but the lode continues unproductive in the 65, west of San Francisco shaft. The ground is moderately easy for driving in the 55, west of San Francisco shaft, and the lode has a promising appearance, yielding ¼ ton of ore per fathom. In the 55, east of San Francisco shaft, the lode is small and compact, yielding ½ ton of ore per fathom. The 45, east of San Francisco shaft, continues unproductive.—Winzes: The men are making good progress in No. 181 winze below the 55, the lode has failed in three feet in a day or two. The lode in No. 183 winze, below the 55, has declined in value in the last few days, yielding 1 ton of ore per fathom. No. 185 winze, sinking below the 55, is down to the 65, and the men put to drive west; the lode has a promising appearance, yielding 1 ton of ore per fathom. The usual average quantity of ore is being raised from the tribute department in the past month, and the stopes are turning out well at present. The operations at surface are going on very regularly, and the machinery is in good condition. We estimate the raisings for March.—Quintos Mine: The 65, west of Taylor's engine-shaft, is hard and poor. The lode in the 55, west of Taylor's engine-shaft, is a little more open than it was—but does not contain any lead. The lode in the 65, east of Taylor's engine shaft, is small, and the ground hard. The lode in the 55, east of Taylor's engine shaft, has improved in appearance, and has greatly improved in the past few days, yielding 4 tons of ore per fathom. In the 45, west of San Carlos shaft, the lode is of a promising appearance, yielding 1 ton of ore per fathom. The 55, west of San Carlos shaft, is unproductive at present. The lode in the 55, east of San Carlos shaft, is looking a little better than it was, and is now under where there was a rich lode in the 45, yielding ½ ton of ore per fathom. The ground is hard, and the lode small and poor, in the 45, east of Judd's shaft. The 32, east of Judd's shaft, has again improved, and is opening out valuable ore ground, yielding 2½ tons per fathom. Some small unproductive branches have been intersected in the 45, south of Henty's shaft, but we have the main lode is still in advance.—Shafts and Winzes: The men are getting on very well with Taylor's engine shaft, sinking below the 65; the lode is worth 1 ton per fathom. The granite is very hard for sinking through in San Carlos shaft, below the 65. Cox's shaft, sinking below the 55, will reach the 55 in the present month. The men are getting on well with Addis's shaft, sinking below the 45. Luca's winze, below the 32, is passing through a lode of fair quality, yielding 1 ton of ore per fathom. Royilio's winze, below the 45, is in a moderately productive lode, yielding 1 ton of ore per fathom. The bottom of Jose's winze, below the 32, is still in old workings, but there is ground at one end with good stones of ore.

PONTGIBAUD.—March 3: Roure: The 100 cross-cut, east of Richard's shaft, progresses favourably. The 60 cross-cut will be under the new shaft in about a fortnight; the ground is rather hard. The 80 metre level, north of cross-cut south of Agnes' shaft, yields stones of ore. The rise in the same level, on old stope, yields a little saving work. The 60 metre level, south on Virginie's lode, yields 1 ton of ore per current metre. The same level north yields also ¼ ton per metre. The 40 metre level south is unproductive, but the same level north yields a little irregularly. The winze sinking behind this end yields ¾ ton of ore per current metre. The 20 metre level south yields ½ ton of ore per metre. The same level north is in a large orey lode, yielding coarse stuff. The adit north yields a little saving work. The mill shaft, sinking below the adit, is now down 22 metres, and the ground continues pretty favourable. The adit level, south of this shaft, yields ¼ ton of ore per metre. The rise in the back yields ½ ton of ore per metre. On tribute pitches throughout this mine continue their usual yield of ore.—La Grange: The 100 plat, at Nosky's shaft, is enlarged and repaired, and the sumpmen are now engaged in repairing the adit, which will require a fortnight to accomplish, before commencing to sink. The 100 metre level north yields a little orey stuff of inferior quality. The tribute pitches are yielding pretty well, on the whole.—La Brousse: The 140 cross-cut, east of Basset's shaft, continues in wet spare ground, consequently our progress is slow. The 120 metre level south yields ½ ton of ore per current metre. The winze below this level, opposite the shaft, is poor. The 100 south yields 1 ton of ore per metre; the winze below this level yields ½ ton. The 80 south has entered softer ground—the lode is unproductive. The winze in the 60 yields ¼ ton of ore per metre. The three stopes (one in back of the 60, one in 80, and one in 100) yield well, as do also the 12 tribute pitches at the various levels.—Prunal: The 70 metre level, north of St. Martin's shaft, has been holed to the same level south of St. George's shaft, and we have now set the men to cut plat at the latter end preparatory to sinking. The 70 north, on the eastern part of the lode, yields a little saving work. The same level south yields ¼ ton of ore per metre. The 70, west of the cross-cut, yields ½ ton of ore per metre. The 50, north of St. George's, yields a little saving work. The 30 south is poor. The 8 cross-cut west is in stiff ground. Our tribute pitches have considerably fallen off in value in the back of the 70, we hope it to be of but temporary duration.—Surface: Our dressing has been carried on with but little hindrance, and the samplings have amounted to 254 tons.—St. Antoine: The sinking of Susan's shaft below the 25 metre level has been slow, having met with a very hard floor of jointy granite; it is changed a little for the better, but still spare for sinking through. The 20 north continues to yield stones of ore. The same level south is without change.

[For remainder of Foreign Mines, see to-day's Journal.]

PUNJAB GOLD.—A nugget of gold was received by the last Indian mail from Parbutta Valley, Kulu, Punjab. It has been presented to the Indian Museum.

HALCOMB VALLEY.—The following is from the San Barnardino *Guardian* of Feb. 1:—"Superintendent Haley, of the Halcomb Valley Gold Mining Company, called at this office on Thursday. He reports prospects good, with some 17 hands employed. The company evidently means business, and intends thoroughly to develope whatever resources the mines possess. The Halcomb Valley mining district was newly organised by a miners' meeting duly called under the United States laws. The records of the old district were destroyed by fire, and a reorganisation became necessary. Mr. C. R. Bennett was elected Recorder of the district.

A LUCKY MINER.—A miner, named Barker, a tributer, working in Dolcoath Mine, Camborne, has just received a pay from that mine of some 200*l*., the result of a "stuart," the whole of which he has invested in the purchase of shares in Dolcoath Mine.

CARZISE.—The 70-in. pumping engine, started on Feb. 11, has continued to work well. The mine is drained to the 13 fm. level, which it is hoped will be cleared within a week from this time. The engine-shaft is divided and cased, and a ladder way fixed to the level. A horse-whim on Gate shaft is about to be erected to clear that and the western part of the mine with all possible speed.

SOUTH TOLCARNE.—We note the continued improvements in this property, indicating that a splendid mine may very soon be opened out. In Innes's lode the stope in the back of the deep adit level, west of cross-cut, is producing 3 tons of copper ore per fathom, and, further, that the engine lode in the deep adit level, east of engine shaft, is improving in the production of rich copper ore to be worth 5*l*. per fathom. More branches of the great champion lode in South Condurrow tin lode are being met with, giving great proofs that the lode will be cut almost immediately, and at once deciding that this mine will become a dividend security.

The Prize Essay—Practical Mining.

No. II.

AIR COMPRESSING MACHINES.

Among the forces selected and applied for driving underground machinery compressed air holds an important place, and its twofold use as a motor and ventilator has led to its extensive adoption for driving boring-machines, coal-cutters, &c. Its use has contributed little to the successful prosecution of some of the most important engineering operations—notably, the Mont Cenis and Hoosac tunnels. Unlike steam or water, which in its application is direct, previous to its use as a motive power, requires either steam or water power as an auxiliary, in order to bring it into use; hence we only regard it as an interpolatory force.

A very prevailing opinion regarding the transmission of compressed air is that it is accompanied with a very great loss of force. Many engineers have experienced a loss of as much as 75 per cent. Mr. Cooper, of Holme Colliery, states that the loss of power has arisen from the use of too small pipes; he says "that with a sufficiently large pipe a power equal to 100 horses can be very economically transmitted a distance of 1 or 1½ mile, where it can be used for various purposes to which steam and horse-power are generally applied." In the Mont Cenis Tunnel air was conveyed four miles through 10 in. pipes, at pressures of 50, 60, and 70 lbs. per square inch, and in the Hoosac Tunnel, Colorado, air is now being conveyed two miles, at 60 to 65 lbs. per inch, through 8-in. pipes, with a loss of only from 1 to 3 lbs. in transmission.

The air compressors consist of single or double air-pumps, driven by steam power. Appliances are employed for keeping the air cool during its compression. Receivers are provided for storing the compressed air from which are supplied the pipes for conveying the same. Rock-drilling engines are supplied by Messrs. Pigott and Farnhill, Old Foundry, Barnsley, the makers of the engines supplied to the Holmes Colliery in 1870. Their price of a single horizontal air-compressor, with steam cylinder 22 in. in diameter, air-compessing cylinder 20 in. in diameter, both 4 ft. stroke, with fly-wheel, wrought-iron crank shaft, lift long enough to attach a second similar engine when required, is 500*l.*; a pair of such engines, 810*l.* This firm will quote prices for any size engines. In the use of the above engines at the Holmes Colliery the air was transmitted through 7-in. pipes. Messrs. Hurd, Albion Ironworks, Wakefield, is the manufacturer of Hurd and Hurd's Differential Lever Air-Compressor. One of these engines was supplied to the collieries of the West Ardsley Company, near Leeds, a few months since. The steam cylinder was 17 in. in diameter, and the double air cylinders 22 in. in diameter. The lever, which is the distinguishing feature of the machine, weighed between 4 and 5 tons. With this machine recent results have shown that 65 lbs. of air-pressure are easily obtained with 80 lbs. of steam. In these results the engine was not worked to its fullest capability. Prices can be obtained by forwarding particulars and nature of work to be done. Also maker of portable air-compressors.

Messrs. Simpson and Co., Pimlico, London, will supply a 10-in. air-compressor for 350*l.*, and a 15-in. compressor, with 20-in. lift, for driving the same, for 650*l.* Messrs. E. R. and F. Turner, Ipswich, are makers of Low's Air-Compressor. Price of a pair of 15-in. cylinders, capable of driving two of Low's rock-drills, 384*l.*, including receiver and connections. A smaller engine, with a pair of 12-in. cylinders, for supplying one drill, 216*l.* The following are also makers:—Messrs. Ommaney and Tatham, Adelphi-street, Salford; Messrs. T. Brown and Co., 95, Newgate-street, London, for the Burleigh rock-drill; Messrs. Ball and Co., 21, New Bridge-street, London, for working the new power-jumper; and Messrs. McKean and Co., Hollinwood-road, London, S.E., for working the McKean rock-drill.

DRAINAGE.

One of the most serious obstacles encountered in prosecuting mines is water. It is not a part of our task to consider the steps which have been taken to diminish the flow of water into the workings, and in the coal fields engineers have devoted much attention to effective means, and employ various contrivances, such as tubbing or casing the shafts. Rather it is our purpose to notice the machinery adopted for discharging the water after it has found its way to the mine, and also the arrangements for quarry drainage. The appliances we notice are Cornish pump-lifts, steam-pumps, centrifugal-pumps, and syphons.

Cornish Pump-Lifts.

The arrangements of plunger and drawing-lifts used in connection with the beam-engine for pumping purposes are universally adopted throughout the world in all well-developed mines which are heavily worked. In this mode of pumping a series of pumps or sets of pumps from the surface to the bottom of the shaft, each set of which generally not exceeding 20 or 30 fms. The bottom lift is called the sawing or bucket-lift, and from its being lowered during the process of sinking the shaft is also called the sinking-lift. In principle it resembles an ordinary bucket-pump of large dimensions, in which the water is raised the height of the lift into a cistern from which the next lift draws. All the other lifts, from their being provided with a plunger, are termed plunger-lifts. Each consists of a plunger-pole working through a stuffing-box into a plunger-case. By the upward stroke of the engine the water is drawn from the supply cistern through a clack, which closes with the downward stroke, and the water is forced through an upper clack to the entire length of the pumps forming the lift.

To the extremity of the engine-beam a main-rod is carried down to the bottom of the shaft. To this the drawing-lifts and all the plungers are connected, so that when the engine performs its stroke each lift supplies the next above it, and so on to the point of delivery. The main-rod consists of a series of large balks, generally Memel deal or pitch pine of the greatest lengths obtainable. These are fastened together by large iron strapping plates on each side of the rods, and bolted through them. The rods are kept in position by guides fixed in the shaft. The plungers are set off the required distance from the rod to which they are fixed by strong bolts and glands.

The weight or plunger-lifts the water is forced upwards by the weight of the rods and plungers through the entire column of pumps. These rods, &c., being much heavier than the water being raised it is not necessary to use one or more counterbalances to overcome the excess of weight. These are either heavy cast-iron beams or trussed beams of wood and iron, and are heavily laden with old iron, stones, &c. When the shaft to be drained is situate at a distance from the engine, and a series of rods are used, smaller than those in the shaft, but connected together in similar manner. They work on wheels or rollers, and actuate the pitwork through the medium of an angle-bob placed at the mouth of the shaft; sometimes, for light purposes, a chain is substituted for flat-rods.

In many of the Cornish mines it is necessary to line the pump-trees with slips of wood to prevent the corrosive action of the water. It is sometimes necessary where the water is impregnated with certain mineral salts to use brass working barrels, plunger-poles, and sometimes to line stuffing-boxes with the same material. Pumps vary in length, but are usually about 9 ft. We give below prices from one of the catalogues, and which may be considered as representing the usual cost of pitwork:—

Plunger Lifts.		Drawing Lifts.		
20 fms.	30 fms.	15 fms.	25 fms.	
£113	£144	£ 87	£121	Price of any separate parts obtained on application to makers.
127	162	97	136	
143	183	107	152	The following are the usual prices of some of the principal parts.
162	205	119	167	
180	228	134	187	Plain pump and wind-bores, 11s. 6d. per cwt.; working barrels, 17s. per cwt.; brass ditto, 24s. per lb. If and door pieces 17s. per cwt.; plunger-poles, 27s. per cwt.; ditto brass, 2s. per lb.
201	254	148	206	
223	282	162	226	
247	310	175	243	
265	336	193	266	
314	394	221	306	
364	453	249	347	

Messrs. Williams' Perran Foundry Company, Cornwall; Messrs. Harvey and Co., Cornwall; Messrs. West and Sons, Cornwall; Messrs. Tangye Brothers, Birmingham.

Steam Pumps.

The system of drainage considered in the preceding article has been found the most effective and economical for heavily watered mines of great depth. During the past few years steam-pumps have been applied to this purpose where the drainage is not heavy. This class of pumps proved so admirably adapted to pumping in manufactories, &c., that the makers of one variety—Messrs. Tangye Brothers, of Birmingham—were induced to try on a larger scale, and test their applicability to mine drainage. So far as they have been used they have been quite a success, being more effective and performing higher duty than was at first supposed.

Steam-pumps, as far as we are aware, have hitherto only been introduced into the coal mines. Up to the end of the year 1870 no less than about 130 were supplied by the above firm alone to the collieries of the Durham and Newcastle districts. Since this period pumps of much larger calibre have been made by Messrs. Tangye Brothers. The following are the largest sizes produced by them:—At the Adelaide Collieries they contracted to supply a pump capable of raising 120 gallons per minute 1040 ft. in a single lift. The steam-cylinder of this pump was 26 in. in diameter, and the pump double-acting, 6½ in. in diameter, with a 6 ft. stroke. Steam was supplied by a double-flued boiler, 27 ft. long, 7 ft. in diameter. Six weeks after it had been working the manager of the collieries reported that the average duty was 137 gallons per minute, being 17 gallons in excess of that stipulated. At the Silverdale Collieries, the steam-cylinder was 32 in. in diameter; water or pump-cylinder, 10½ in. in diameter; stroke 6 ft. This engine is capable of raising 375 gallons per minute 540 ft.

Instead of being placed near the pit's mouth, as in the Cornish mode of pumping, the engine is fixed at the bottom of the pit, in close proximity to the water. A boiler adjacent to the shaft is all that is necessary on the surface; from thence steam is taken down to the engine through a clothed steam-pipe. The pump or engine may be fixed in the most convenient spot for connecting the steam, suction, and delivery pipes. These pumps are equally adapted to the drainage of quarries, but whether they may be advantageously used for the exceptional requirements of metalliferous mining, such as rapid sinking, &c., remains a matter of trial, though under certain favourable circumstances surely they must be invaluable adjuncts even in this class of mining.

The following are Messrs. Tangye Brothers' prices:—

Gallons per hours (approximate).	Prices.
680	£16
1,830	30
5,070	50
13,000	100

We have selected these from their elaborate catalogue, which gives the fullest particulars of size and prices of numerous other sizes. Hayward Tyler and Co., 84 and 85, Whitecross-street, St. Luke's, London, supply their Patent Universal Steam-Pumps in the largest sizes, and state that they will give prices on receipt of particulars.

John Ramsbottom, Saynor-road, Hunslet, Leeds, is a manufacturer of steam-pumps, and will give prices for special pumps, if furnished with particulars of steam-pressure, resistance, and quantity of water to be raised per hour.

Centrifugal Pumps.

These pumps cannot be used for drainage at any ordinary depth; they might be used for draining shallow quarries, supplying water from a stream or other body of water, for dressing purposes, or diverting the course of a stream. Portable engines are the most convenient for working these pumps. Messrs. Gwynne and Co., London, give the following approximate prices:—

Gallons per minute.	Raising 1 ft. to 90 ft. high.	200 ft. high.	For low lifts and large quantities.
80 to 120	£ 13		£46
500 to 900	35	about £109	
2500 to 7000	166	586	about 99

Their elaborate catalogue gives the fullest particulars. Messrs. Marquis Brothers, Glasgow, makers; Mr. William Gunther, Engineering Works, Oldham, maker.

Syphons.

Syphon pipes can be employed with advantage for draining quarries situate on the side of a hill, utilising water-courses, &c., for various mining purposes, where a point of discharge is found lower than the level to be drained.

VENTILATION.

Any means that can be adopted for effectually removing foul gases, injurious air, or unhealthy vapours, and for lowering the temperature and supplying cool and healthy air, cannot fail to be of great importance to mining generally, although in Cornwall, and in metalliferous mines throughout, artificial ventilation is not resorted to on any large scale, means being contrived in opening out the mines to secure a natural supply of good air throughout the workings. In sinking shafts, however, or in driving long distances, and in rises, and for reducing the temperature in deep mines, air is supplied artificially, either by bratticing and the use of air-sollars, or by fans and air-pumps, which latter are usually constructed with trifling expense on the mine.

In collieries we meet with ventilating arrangements on the most extensive scale, and every effort of the engineer has been put forth to secure the most perfect ventilation both by natural and artificial means. We classify the appliances under this head as follows:—ventilation by furnaces, as aids to natural ventilation; mechanical ventilators, as pumps, fans, &c.; ventilation by steam-jets.

The two latter of these classes only will be considered. Professor Smyth, in his work on "Coal and Coal Mining," has ably treated both on the principles and practice of colliery ventilation to which we refer.

Alluding to the vast number of contrivances employed he says, "it would need a volume fairly to describe them," and he has enumerated the following as a few of the machines which have been most efficiently employed.

Air Pumps:—Struve, Nixon.
Fans:—Guibal, Lemielle, Fabry.

The following capabilities of these machines, gathered from those in actual use, will sufficiently show their value.

Struve's Ventilators.—"These usually consist of air pumps worked by steam-engine, and are capable of giving a theoretical amount of 20,000 to 100,000 cubic feet per minnte. Several now working in the South Wales collieries" (Smyth).

Nixon's Ventilator, "working at the Navigation Pit, near Aberdare, has sheet-iron pistons, 30 ft. by 22 ft., or no less than 660 ft. area each, expel at nine strokes per minute the theoretical quantity of 166,000 cubic feet per minute, but a large reduction has to be made for leakage" (Smyth).

The Guibal Fan, or centrifugal ventilator, is being largely employed in this and other countries. We give the following few samples:—Stella Colliery: Fan 16 ft. diameter, 4 ft. wide, 50 revolutions, and 36,000 cubic ft. per minute; driven by steam-engine. Throckley Colliery: Fan 18 ft. diameter, 4 ft. wide, 36 revolutions per minute, and 36,000 cubic feet. — Usworth Colliery: About 18 months ago a fan on this principle, and one of the largest yet erected, was the subject of an experiment at this colliery, before the leading gentlemen connected with the coal trade in the North of England, with the following results:—The diameter was 45 ft., and width 12 ft., and, at 40 revolutions per minute, supplied 147,000 cubic feet per minute. It was estimated that with 60 revolutions per minute the minimum quantity would be about 240,000 cubic feet. The fan was driven by a double engine; they were both constructed by Messrs. Black, Hawthorn, and Co., Gateshead. Guibal's Fans, of all sizes, are made by this firm, from whom prices may be obtained, or from Mr. Guibal's agent in England, Mr. D. P. Morrison, 21, New Collingwood-street, Newcastle-on-Tyne.

The Lemielle Fan.—This machine is thought to be particularly applicable to mines having contracted air-ways, and works many years with few repairs. The fan used at the Washington Colliery is 24 ft. high, cylinder 22 ft. long, and with 17 revolutions per minute supplies 130,000 cubic feet per minute.

The Fabry Fan.—Professor Smyth says of this fan, that "the moderate velocity at which it may be driven, and its durability, have obtained for this machine a good name."

Different varieties of fans are made by Messrs. Black, Hawthorn, and Co., Gateshead; the Lilleshall Company, Oakengates, Shropshire. The Union Engineering Company are manufacturers of various classes of fans, and the following are prices of their smaller fans:—

For supplying 14,000 cubic per minute	£56	8	0
Ditto 28,000 ditto	86	8	0

The quantity of air per minute may be varied by a slight increase or decrease in the speed of the fan, and the above represents an approximate calculation. We learn from their latest circular they are makers of a special fan for colliery ventilation, and are ready to give full particulars for any special work, on application to their offices, 2, Clarence-buildings, Brook-street, Manchester.

Messrs. Gwynne and Co., Essex-street Works, Strand, London, give the following prices of exhaust fans, with steam-engine combined:—

Discharge per minute, 15,000 cubic feet	£220	0	0
Ditto 25,000 ditto	275	0	0
Ditto 40,000 ditto	390	0	0

Mr. Isaac G. Bass, 18, Bow-street, Sheffield, will supply prices of any kinds of ventilating fans.

Ventilation by Steam Jets.

Attempts have been made at different times to substitute high-pressure steam in place of furnace ventilation, the steam being allowed to escape from a number of small jets. These experiments have been found unsuccessful except as auxiliaries in time of accident. Mr. Scott, of Manchester, has lately brought into notice an arrangement for ventilation by steam, for which he claims great advantages. In our communication with him he states that his apparatus is not yet sufficiently perfected in detail for publication; but speaking of it he says—"Previous attempts in the same direction have all uniformly failed, while this is a success."

On application, with full particulars of requirements, Mr. Scott will prepare special quotations. Address, Crown Ironworks, West Gorton, Manchester.

[*To be continued in next week's Journal.*]

PRACTICAL ENGINEERING CLASSES AT THE CRYSTAL PALACE.

The Crystal Palace was originated as an educational institution, but with a large infusion of fashionable and attractive entertainment, thus affording instruction combined with an instructive round of amusement. Some may doubt whether it has fully realised the object of his first promoters, from the fact that its School of Art, Science, and Literature forms no very striking feature to common observers, and its courses of popular lectures instead of being maintained, have disappeared from recent programmes. The educational department is under the able general superintendance of Mr. F. K. J. Shenton; and for the further extension of the facilities afforded, the committee of directors have this year established "Practical Engineering Classes," over which Mr. J. W. Wilson, A.I.C.E., is the principal. The necessary lecture room, workshops, and foundry for this department are located in and adjoining the southern tower of the palace, than which nothing could possibly be more suitable for space, light, and ventilation. Mr. Wilson gives lectures to the pupils twice a week, and every day they are practically engaged in the drawing offlie, pattern or fitting shop, foundry, or smithy. The progress made by the pupils in drawing, in so short a time as they have been engaged, is truly remarkable and highly gratifying.

The pupils are being practically instructed, not in chance work, as in an ordinary engineering establishment, but on such general or special employment as appears best suited to their future prospects. The sailor requiring one branch, the agriculturist another, and the machinist something different again; whereas it is usual for the pupil-engineer to learn as best he can from whatever class of work his employers may have in hand, who, reasonably enough, make their own interest of the first consideration; whereas here the engineering class work for their individual interests, and not on works required for the palace. The pupils are, in consequence, taught mechanical drawing, estimating and calculating, pattern and model making, and twice a week attend lectures on theoretical and practical engineering. The several workshops are very complete, suitable for the accommodation of 50 or more students, and are supplied with excellent machinery, and every other requisite in the way of tools, furnaces, and fittings. Such being the design and scope of this undertaking, the terms appear exceedingly reasonable, being 50 guineas per annum (three terms); and 17*l.* 10*s.* for each additional term.

As a branch of Technical Education this institution offers a fine opportunity for young men intending to emigrate to our colonies—say, to Australia, Tasmania, New Zealand, or Islands of the South Pacific. The youth of the present generation can acquire a knowledge of Agricultural Chemistry at the College instituted for that purpose at Cirencester, and now, as above, that most important one of Practical Engineering, which, whether for the farm or for mining, is of incalculable value. In short such education is almost of more real usefulness to the young colonist than even capital itself, where, although the land be ever so reasonable in price, every kind of labour rates high, and none are better paid than the superintending engineer or chemist, on whom the working of the largest and most valuable estates may depend. And thus it becomes far easier to create capital during the early years of life devoted to the service of others, than with capital, but without requisite training, to employ it to the best advantage. Besides, in every young colony the engineer and the chemist are the very men of all others to turn native products to the best possible account. The old sources of employment are all but worn out for the rising generation, and it behoves parents to provide their sons with means offering resources which are equally useful and valuable at home and abroad. The emigrant leaves his native shore but too often as a last resource, and rather in despair, than provided for the exigencies of a novel situation, hence the long roll of misfortunes recorded of young lawyers, bank and mercantile clerks, shop assistants, and light porters, who, if not rich at home, might have at least lived respectably among their acquaintances, but falling from their proud estate, undertake the lowest and most menial offices "to keep the wolf from the door." The properly educated young man, educated to rough it in the back woods and forests, and like Robinson Crusoe to turn every apparent disadvantage to some source of usefulness, will live, and flourish, and prosper where the artificial West-end fop would in such an ungenial soil pine and perish from absolute necessity of his case. We, therefore, hail the establishment of these engineering classes as a move deserving, as it no doubt will receive, unbounded approval and support.

The Yale Double Engine.—A very compact and handsome engine is at present being manufactured at the Yale Ironworks, New Haven, U.S. The base plate is one piece, having the outer bearing for the engine-shaft cast upon it being firmly bolted to the frame, and provided with four lugs for bolting to the engine foundation. The frame is one piece, with cross-head guides cast upon it, making the whole solid and rigid, while all the arrangements connected with it are such that there is free access to all parts requiring care and adjustment. A steam-cylinder of the ordinary three-ported construction, with steam-chest cast upon it, and fitted with a finished steam-chest cover, secured by stud-bolts, finished with polished case-hardened nuts. The cylinder cover is finished and secured in like manner, and the cylinder is lagged with black walnut, and furnished with Frink's patent lubricator. The piston is cast-iron, fitted with followers and iron packing rings, actuated by steel springs. The piston-rod is made of steel and cross-heads of cast iron, fitted with adjustable brass gibs; the connecting-rod is of wrought-iron, fitted with the usual straps, key and brass boxes, so that all the wear may be readily taken up. The shaft is of hammered wrought-iron, unusually large, running on extra large brass boxes; fly-wheel extra heavy, as the cut shows; valve stem steel; slide valve of the ordinary construction, with sufficient lap to cut off at three-quarters of the stroke. The Yale engine is especially recommended for mining purposes, as it is so constructed that it can be taken into pieces that can be transported wherever mule can go; so that the advantage of steam-power may be had in many places which it would be impracticable to take other engines.

Manufacture of Malleable Iron.—The features of novelty in the invention of Mr. C. Frickenger, of Berlin, consists in the combination of two ovens or annealing chambers, which are alternately in communication with a gas generator for supplying the gas, which in this invention constitutes the heating medium. These ovens are each constructed with two chambers, one above the other, and the gas which is first admitted to the lower chamber finds its way through suitable holes to the upper and annealing chamber, where it is ignited, and then passes through passages to the adjoining upper or annealing chamber, from whence it escapes by a side passage into the chimney, thus heating both furnaces with the same supply of gas; the air necessary for supporting combustion is supplied through holes formed through the sides of the ovens, close to the holes which admit the gas from the lower to the upper chamber. In first starting the heating of these chambers it is necessary to have a flue of a fire place in communication with one of the chambers until such chamber becomes heated to redness and ignites the gas, when the supply

of such gas will afterwards keep up the requisite temperature of the chambers for any length of time. Suitable dampers are provided in the various passages or flues in order to divert the course of the gases according as one oven or the other is required to be hottest, or to open a communication with the chimney direct when deemed necessary.

COLLIERY AND IRONWORKS BOILERS.

There is gratifying information in the report of Mr. E. B. Marten, the chief engineer of the Midland Boiler Inspection and Assurance Company, from which, as it related to "a year's explosions," we gave an extract in the *Mining Journal* of last week. The report shows not only that the number of boilers brought under inspection and assurance is increasing, but likewise that the attendants are becoming more watchful and more sensible of the benefit they derive from the assistance of the inspectors. Of the whole 3285 boilers in the care of this company 1155 are used at collieries and 1504 at ironworks. The increase in boilers placed under the company's care has been 180 in the past half-year; and whilst, as to the department of boiler management which belongs to the boiler minder, most of the usual deficiencies have been noted, such as overloaded safety valves, defective gauges, or leaking joints, there have at the same time been marked cases of improvement in this same department, and the men have, Mr. Marten remarks, shown "a readiness to profit to the utmost by any help or information given by the inspectors." Amongst other ways this has been displayed by more notices than formerly having been sent by attendants when opportunities for examination have occurred unexpectedly. Of all the boilers which cause the most anxiety to ironmasters and to boiler inspectors the chief are those which are employed in utilising the blast-furnace gases. Mr. Marten points out correctly enough that—

"The extreme length of these boilers causes the unequal expansion from the variable heat of the bottom, and the comparatively uniform cool top, to show itself in alternately lifting off the end or central supports, converting the boiler into a girder, at one time supported at the ends and loaded in the centre, or at another time supported at the centre and loaded at the ends. The strain thus produced is in addition to the injury caused by the rapid alterations of temperature when the gas is suddenly lighted or extinguished."

He then shows that—

"The effects of the lifting may be much mitigated by the volute springs or balanced supports adopted by Mr. Head, of Middlesborough, but the lifting itself would not take place if the long boilers were cut into two or more shorter lengths placed one beyond the other, and each supported at only two places."

To meet the objections sometimes raised to this, that the use of double fittings would become almost indispensable, Mr. Marten recommends the connecting of the separate compartments with a bent wrought-iron pipe at the upper part, the feed-pipe remaining on the back compartment and the steam-pipes on the front.

"The feed would thus fill the back compartment and overflow into the forward part, any steam formed passing with the water. The water-gauge would be needed on the front part only. This alteration necessitates only the dividing of the boiler, and in most cases no alteration at all to the fittings, while it would secure the advantages found in similar arrangements of plain cylinder boilers side by side with a continuous flue around them, that the water would deposit its scale and mud in the part farthest from the heat, and pass gradually on to the hottest place."

Amongst the newer works now in course of construction, pretty much such combinations of plain cylinders as are here described are being adopted, though amongst the efforts that have been made to overcome the difficulties attending the long plain cylinder boiler, two well-known forms of tube boilers have proved satisfactory to the ironmasters who are using them.

CO-OPERATION IN THE IRON TRADE, AND WORKMEN'S EXCESSES.

Messrs. Fox, Head, and Co. have made their fourth annual distribution among their employees of profits which if they had been made would, without the operation of that principle of co-operation which those ironmasters act upon, have gone into the pockets of the employers only. This firm, it will be remembered, are the proprietors of the Newport Rolling Mills, at Middlesborough, and they are acting with their workpeople somewhat as Messrs. Briggs are acting with their colliers. They are dividing a certain portion of the profits of their concern amongst those people who have helped to make them. Last year the operatives and clerks received 3¼ per cent. upon their earnings as a bonus. This year they receive 3¼ per cent., and altogether will have had given to them some 5500*l*. Notwithstanding the great advantages that the men derive from this system of remuneration, Messrs. Fox, Head, and Co. said, through Mr. Fox, that co-operation was not yet completely successful: "it wanted a little more pulling together." Considerable as was the benefit that the men derived from the year's trading, it would have been much more but for the conduct of a section of the men who had forfeited their right to share in the division.

The firm had made some good contracts, and when they met their workmen last year they told them that it was likely to be the best year they had ever had, provided they could keep the works regularly and fully employed. That, however, did not happen, partly on account of the difficulty in obtaining a supply of materials, but principally on account of their puddlers not working so satisfactorily as they had previously done. Last summer when short of puddled bars they had to purchase some at high prices. "It went against the grain to do that," said Mr. Fox, but as some of the men were working well the firm wanted to do their best. Once or twice when some of the men were trying to force them to grant unreasonable requests they were on the point of closing the works altogether. It would have been better for the firm to do so, but their first consideration was to keep the men fully at work. They determined to carry out their agreement; they would continue to show that their policy was a straightforward one, and they would do what they had promised. As 450 out of 500 men stood by them they felt encouraged to persevere.

They did persevere, with the result we have stated. Most sincerely we wish them success, assured that the plan cannot but work to the advantage alike of men, of masters, and of the consuming public. Let it be hoped that the puddlers of the North, who, like most of the ironworkers, have during the past twelve months secured a rise of 25 per cent. in their wages, will show a little more consideration for the claims of their employers and of their fellow-workmen, though they may be careless about themselves and their families. By the course they pursued in forcing their employers to buy puddled bars, Messrs. Fox, Head, and Co.'s puddlers lost 26*l*. themselves, and it is computed that they occasioned a loss to the rest of the operatives in the employ of the same firm to the extent of 3*l*. 8*s*. per man. With the probability of higher wages having to be received after the end of the month, we cannot say that experience encourages us to anticipate much change in the future upon what has happened in the past. If, however, under any circumstances, such men can be prevailed upon to do their duty it is under co-operation, for if the offending section should put themselves outside the pale of advantage they have to meet the influence of their fellow workpeople, whose interests they are damaging. That influence cannot fail to check much disposition to indolence and unreasonable demands. Whatever, therefore, Messrs. Fox, Head, and Co., and some five-sixths, perhaps, of their people, may have had to lose by the conduct of the thriftless few, we make no doubt that, under a system of relation between masters and men less conducive to mutual advantage, the loss would have been much greater.

IMPROVEMENTS IN STEAM-BOILER FURNACES.—The invention of MR. J. K. BUCHANAN, of Manchester, consists in arranging two doors in front of a furnace combined with mechanism for supplying air above the fire-bars, so that the stoker will be in a measure compelled to supply the fuel, first on one side, and then on the other side of the furnace alternately, this mode of firing being that which promotes the most perfect consumption of the smoke as the combustible gases generated from the fuel thrown upon one side of the fire are ignited by the incandescent fuel on the other side of the fire alternately; secondly, he proposes to close the ash pit by a frame having a valvular arrangement in it for air to pass, such valvular arrangement being connected with a diaphragm acted upon by the pressure of the steam in the boiler, this arrangement regulating the supply of air through the fire-bars, according to the pressure of the steam, without interfering with the supply of air above the fire-bars, which is intended for consuming the smoke and unburnt gases, the full force of the chimney-draught being maintained by this arrangement; to use a partition or deflector in the fire-box of vertical boilers above the fuel to cause the gases to pass near the fire-door, so as to mix with air admitted there for igniting the unburnt gases before they pass up the flues or tubes above the partition; and to employ rocking fire-bars, made with zig-zag or wavy slots, laterally instead of straight as hitherto, placing such bars with their lengthway in the lengthway of the furnace, with the rocking pivots parallel to the axis of the pivots upon which the bars rock, and arranged with a key or rocking lever that can only be applied to rock, and withdraw after rocking, when the bars are in their centre of oscillation with their faces all in a line.

AWARDED TWENTY GOLD AND SILVER FIRST-CLASS PRIZE MEDALS.

IMMENSE SAVING OF LABOUR

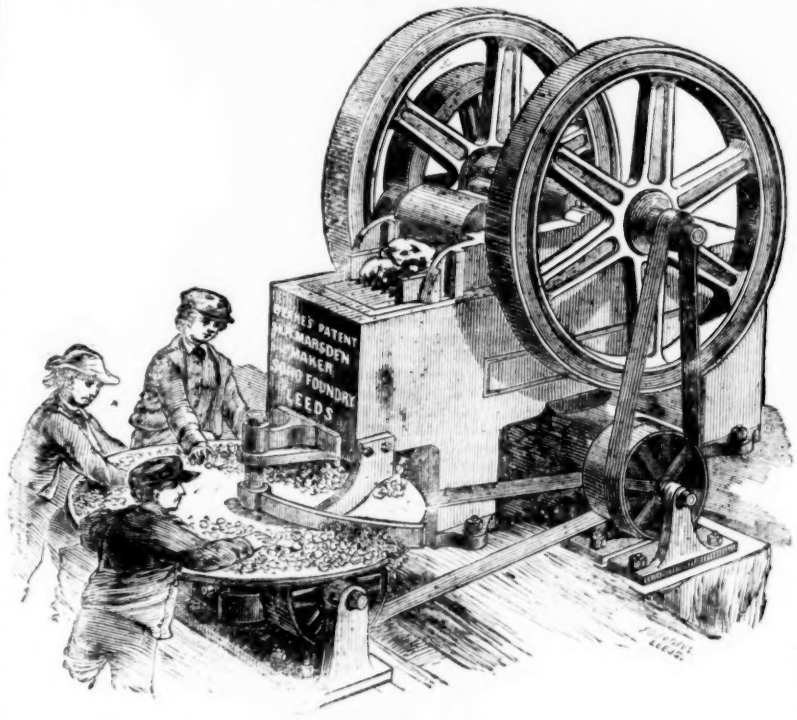
TO MINERS, IRONMASTERS, MANUFACTURING CHEMISTS, RAILWAY COMPANIES, EMERY AND FLINT GRINDERS, McADAM ROAD MAKERS, &c., &c.

BLAKE'S PATENT STONE BREAKER OR ORE-CRUSHING MACHINE,

FOR REDUCING TO SMALL FRAGMENTS ROCKS, ORES, AND MINERALS OF EVERY KIND.

This is the only machine that has proved a success. This machine was shown in full operation at the Royal Agricultural Society's Show at Manchester, and at the Highland Agricultural Society's Show at Edinburgh, where it broke 1¼ ton of the hardest trap or whinstone in eight minutes, and was AWARDED TWO FIRST-CLASS SILVER MEDALS. It has also just received a SPECIAL GOLD MEDAL at Santiago, Chili.

It is rapidly making its way to all parts of the globe, being now in profitable use in California, Washoe, Lake Superior, Australia, Cuba, Chili, Brazil, and throughout the United States and England. Read extracts of testimonials:—



The Parys Mines Company, Parys Mines, near Bangor, June 6.—We have had one of your ore-breakers in use during the last 12 months, and Capt. Morcom reports most favourably as to its capabilities of crushing the materials to the required size, and its great economy in doing so with manual labour.

For the Parys Mining Company,
H. R. Marsden, Esq. JAMES WILLIAMS.

The Van Mining Company (Limited), Van Mines, Llanidloes, Feb. 6, 1871.—Our machine, 10 by 7, is now breaking 180 tons of stone per crusher every 24 hours. I may say of all the machinery, that for simplicity of construction and dispatch in their work, they are equal to anything in the kingdom, but your stone breaker surpasses them all.
H. R. Marsden, Esq., Leeds. W. WILLIAMS.

Chacewater, Cornwall, Jan. 27, 1869.—I have great pleasure in stating that the patent ore-breaker I bought of you some three years ago for mines in Chili, continues to do its work well and gives great satisfaction. It crushes the hardest copper ore stone—put it through to any size by horse power—with great ease. I can safely recommend it to all in want of a crusher, as it can be driven by steam, water, or horse power.
H. R. Marsden, Esq. JAMES PHILLIPS.

Terras Tin Mining Co. (Limited), near Crowpound Road, Cornwall, Jan. 1871.—Blake's patent stone crusher, supplied by you to this company, is a fascination—the wonder and admiration of the neighbourhood. Its simplicity is also very great. Persons visiting it when not at work have been heard to remark, "This can't be all of the machine." It will crush to a small size from 8 to 10 tons of very hard and tough elvan rock per hour; taking into its leviathan jaws pieces of the hardest rock, weighing 200 lbs. or more, and eating the same into small bits with as much apparent ease and pleasure as does a horse a mouthful of oats. On every 100 tons of the rock crushed by the machine there is a direct saving to the company of not less than £5 over the process of hand labour previously adopted by them, and the indirect saving much more, the machine being ever ready to perform the duties required of it. It breaks the stuff much smaller, and in form so fitted for the stamps, that they will do one-third more in a given time than when performed by hand labour.
JOS. GILBERT MARTIN.
H. R. Marsden, Esq., Leeds.

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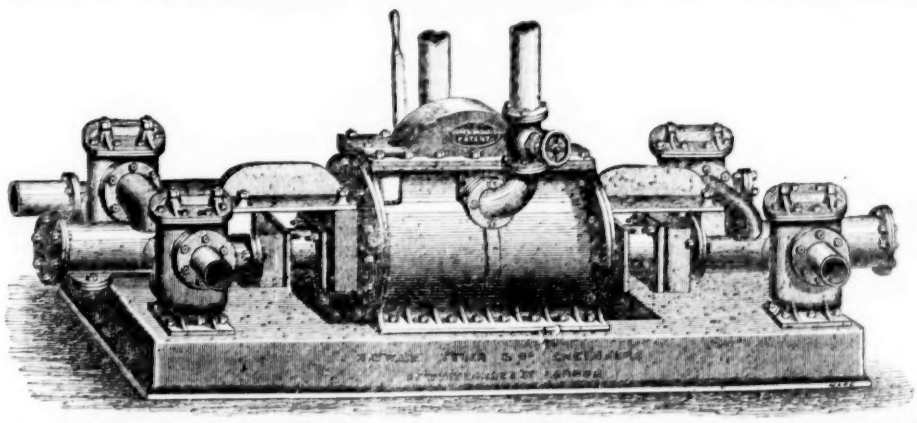

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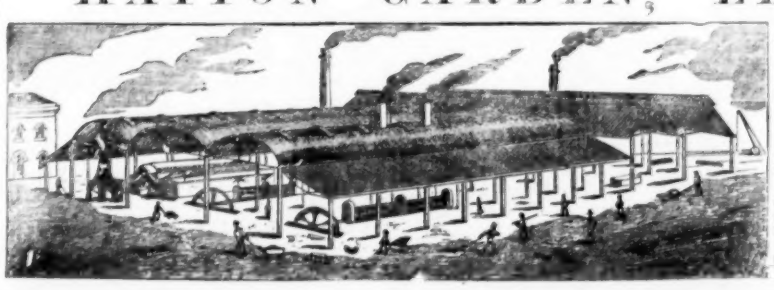

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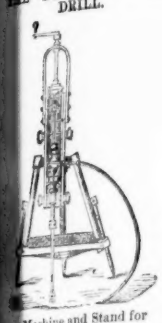

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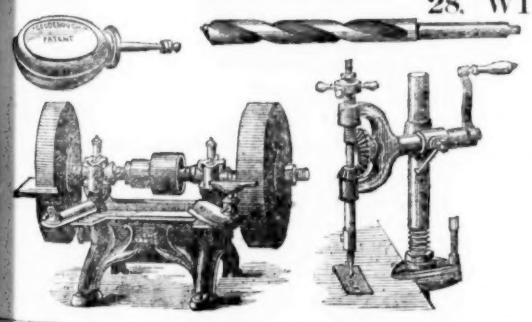

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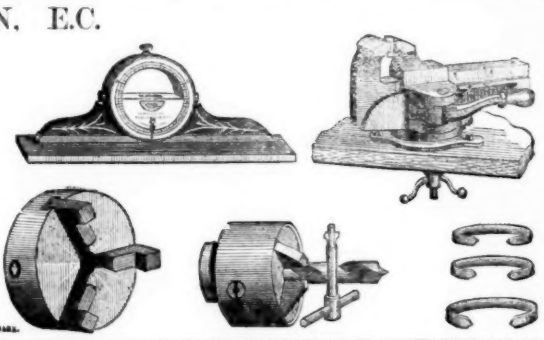

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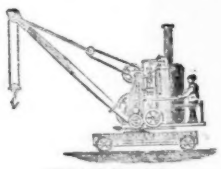

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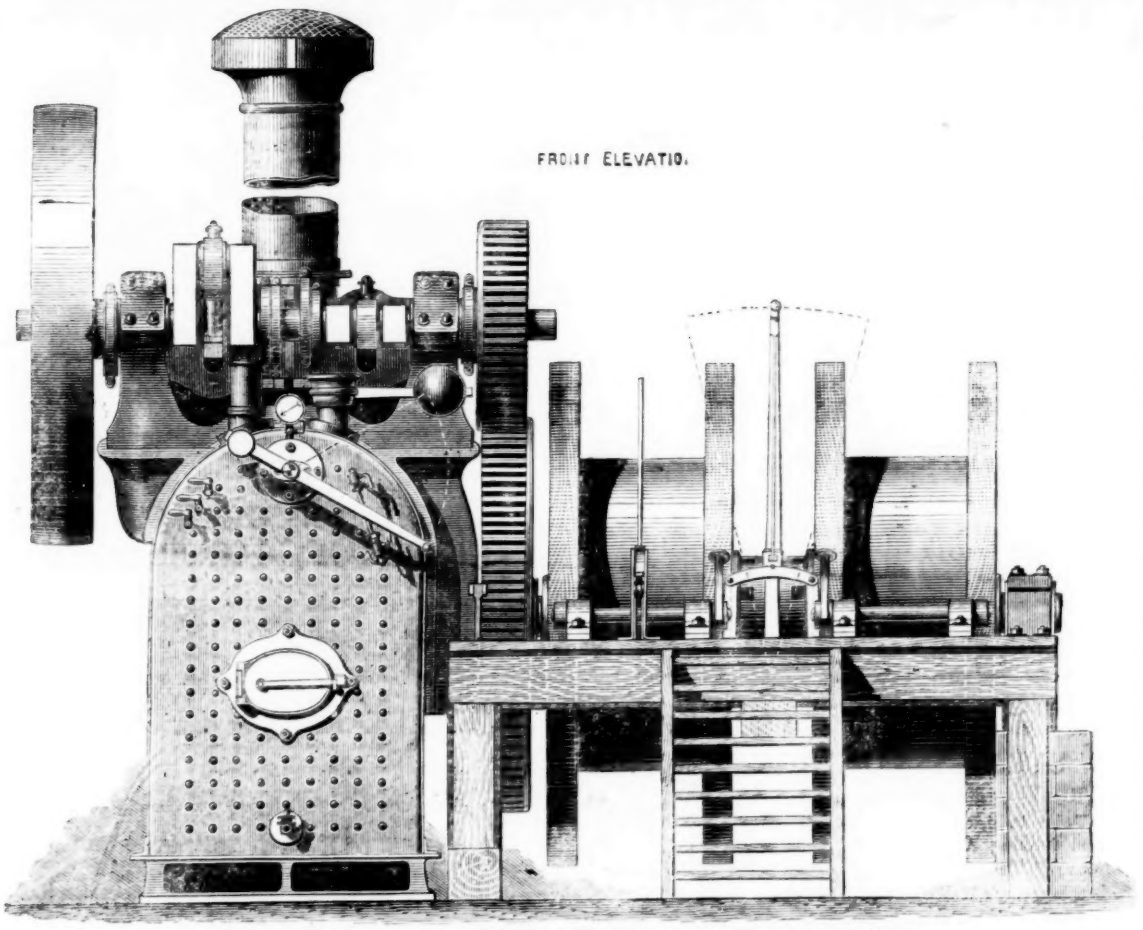

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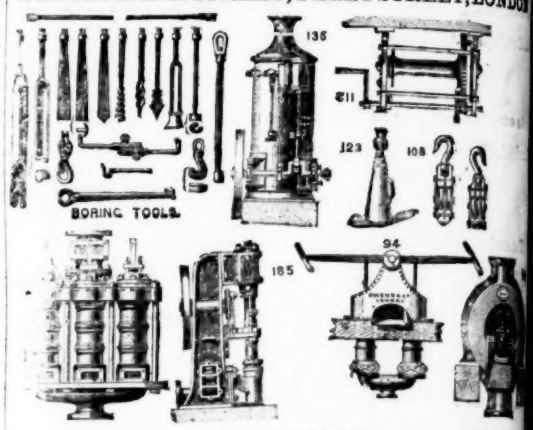

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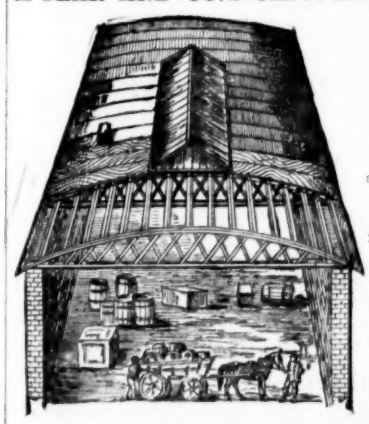

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